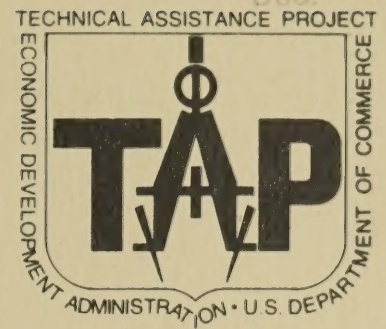


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# **IMPACT OF ENVIRONMENTAL REGULATIONS ON INDUSTRIAL DEVELOPMENT IN NORTH CAROLINA**

APR 5 1982

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Research Report Prepared for the Office of Regulatory Relations  
North Carolina Department of Natural Resources and Community Development

IMPACT OF ENVIRONMENTAL REGULATIONS ON  
INDUSTRIAL DEVELOPMENT IN NORTH CAROLINA

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"This technical assistance study was accomplished by professional consultants under contract with the Economic Development Administration. The statements, findings, conclusions, recommendations, and other data in this report are solely those of the contractor and do not necessarily reflect the views of the Economic Development Administration."

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## EXECUTIVE SUMMARY

The purpose of this study was to investigate the effect of environmental regulation in North Carolina on the decisions of manufacturing firms to build new industrial facilities or expand existing ones in the state. Using a combination of mail questionnaires and telephone interviews with management, the research team collected responses on the importance of locational factors in recent industrial siting decisions. The survey focused solely on the location decisions of relatively new manufacturing plants constructed between January 1, 1977 and March 31, 1981 in North Carolina, South Carolina and Virginia. The inclusion of South Carolina and Virginia provided benchmarks for assessing North Carolina firms' experience with environmental regulations.

	<u>North Carolina</u>	<u>South Carolina</u>	<u>Virginia</u>	<u>Total</u>
Number Surveyed	170	89	58	317
Number Responded	116	59	29	204
Response Rate	68%	66%	50%	64%

Members of management who were involved in deciding where to locate the plants studied were asked to rate the importance of various factors in choosing a site. These factors covered the major economic considerations, including environmental regulations and permits; in addition, management was asked to report the degree to which quality-of-life factors such as education quality, housing and community livability were taken into consideration. In a comprehensive set of questions dealing with the firms' experiences with obtaining permits and the regulatory involvement with constructing the facility, an attempt was made to uncover actual problems and attitudes towards the regulatory environment of the three states. Finally, an

opportunity was provided for respondents to make comments on the regulatory process and give suggestions for improving it.

#### Key Locational Factors

The top five location factors given the most weight by all firms were (1) state and local industrial climate, (2) labor productivity, (3) transportation, (4) land availability and (5) the cost of land and construction. A 1980 study, Manufacturing Business Climates, by Alexander Grant & Co. gave the following national industrial climate rankings to the three states surveyed:

North Carolina	Second
South Carolina	Third
Virginia	Fourteenth

Most firms surveyed indicated that environmental regulations were of only moderate importance in their choice of a site for a new plant. For all firms, state/local environmental regulations and permit processing was rated 2.9 in importance on a five-point scale, where 1 is not important and 5 is extremely important. Out of 19 business factors affecting industrial location decisions, North Carolina firms' ranked environmental regulations 14th and solid/hazardous waste disposal facilities as 19th. South Carolina and Virginia ranked these factors 13th and 19th respectively.

#### States Considered Best for New Industrial Facilities

Managers were asked to indicate the top three states for locating a new facility in their industry. In voting for the best states for industrial investment, managers ranked the state in which their plant was actually located highest, but North Carolina was preferred over other states by a wider margin than was the case for firms located in Virginia or South Carolina.



Of the North Carolina firms reporting their most preferred states for locating a new plant, firms rated their state as follows:

- 75% of the large firms (250+ employees) rated North Carolina first choice
- 70% of the medium size firms (50-249 employees) rated North Carolina first choice
- 54% of the small firms (under 50 employees) rated North Carolina first choice.

North Carolina comes in with a strong performance both overall and among facilities in the state.

#### Quality of Life Location Factors

Twelve community quality of life factors were ranked by all firms in the three-state survey. The top five factors for all firms were (1) educational system, (2) cost of living, (3) housing, (4) physical quality of air and water resources, and (5) personal taxes. The states ranked these as follows:

<u>Community Quality of Life Factors</u>	<u>Rank by State</u>			<u>Rank by All Firms</u>
	<u>N.C.</u>	<u>S.C.</u>	<u>Va.</u>	
Educational System	1	1	1	1
Cost of Living	3	2	4	2
Housing	2	3	2	3
Physical Quality of Air and Water Resources	4	6	6	4
Personal Taxes	6	4	2	5

Firms tend to scrutinize both business factors and community quality of life factors when locating large plants. On the other hand, small plants often do not consider alternate sites for plants and often locate them based on the location of the owner's home and family rather than for either the business factors or the community quality of life factors listed in the survey.

### Firms' Experience With the Environmental Permitting Process

All firms were surveyed concerning their experience with the environmental permitting process. The responses indicate North Carolina has the highest percentage of facilities in which environmental concerns were incorporated into site selection from the beginning of the process:

North Carolina	63%
South Carolina	48%
Virginia	50%

For all three states, most firms allow ample time for environmental regulations to be considered when locating a site for a new plant.

Environmental requirements were considered at the beginning of the planning process more often for large industrial plants than for small or medium sized plants. Since large plants require more permits with more complicated analysis, they tend to allow more time to accommodate these requirements.

Firms which had experience with state environmental agencies were asked to evaluate the administrative procedures for the state in which they located. Each firm was asked to compare the following four procedural categories in their state with those of other states with which they were familiar:

- time required to review a permit application
- ease of analysis
- the availability of data to carry out that analysis
- enforcement

Time: Most firms felt the review time of the state in which they located a plant was better than or about the same as other states. North Carolina firms rated the review time required by North Carolina as better than other states more frequently than firms locating in Virginia or South



Carolina.

Ease of Analysis and Data Availability: The complexity of analysis and data availability were rated better than other states less frequently in North Carolina than in South Carolina and Virginia.

Enforcement: In each state, firms tended to rate the reasonableness of their state's enforcement policy more highly than other aspects of the permitting process. North Carolina was rated better than or the same as other states by 92 percent of the North Carolina firms interviewed, although it received less "better than" ratings than South Carolina or Virginia.

Sixty-three percent of the small firms rated enforcement policy in North Carolina as "better than" other states, whereas only 27 percent of large firms rated the state better. However, for all categories, no large firm rated North Carolina worse than other states with which management was familiar.

North Carolina Administrative Procedures: North Carolina firms were examined in more detail for their evaluation of the state's administrative procedures. The firms obtaining one of the major permits (air quality, NPDES, hazardous waste) were more likely to rate North Carolina better than other states with which they were familiar. Their rating is as follows:

<u>Permit</u>	<u>Rating</u>
Air Quality	44% rated N. C. better than other states in time required to review permit applications compared to 39% for all firms.
NPDES	Firms obtaining NPDES permits were most likely to rate availability of data and reasonableness of enforcement policy as better than those of other states.
Hazardous Waste	Ease of analysis was rated somewhat better than average for firms obtaining a hazardous waste permit.

Environmental Permitting Process Summary: Firms tended to rate the environmental permitting process of the state they located in as the same as or better than other states with which they had had experience. Few major differences were found among the three states in any of the four aspects of the regulatory process which were examined. Where differences do occur, they are small enough not to have a major influence on the location decision of firms.

Impacts of Environmental Regulations on Industrial Site Selection and Development

It is important to reiterate a key finding noted earlier. That is, environmental regulations are only of moderate importance in most firms' plant location decisions. Only two industrial groups ranked environmental regulations among the top ten factors they considered in siting a new plant--chemical firms, which ranked environmental regulations fourth, and textile firms, which ranked them ninth. Environmental regulations come into play only at the margins of industrial firms' site selection decision processes, after a number of more critical factors have been examined and evaluated.

Very few firms in North Carolina, South Carolina, or Virginia--under 10 percent of the industrial facilities locating in each state--reported avoiding a potential site because of water or air conditions.

For most firms--over 90 percent of the new industrial facilities locating in North Carolina, South Carolina, and Virginia--the cost of complying with environmental regulations was not a factor considered in selecting a plant site. Procedural factors--such as data availability, complexity of the analyses required for permits, and the review time before a permit was issued--were somewhat more likely to have been considered. Even so,



procedural factors were considered by only 14 percent of the new industrial facilities locating in the three states.

The role of these factors associated with state environmental regulations increases with the size of the facility being located. However, in none of the 150-plus plant location decisions studied was a potential North Carolina industrial facility lost to another state because of North Carolina's environmental regulations.

#### Recommendations from the Respondents

When the managers from these companies were asked for recommendations for improving state environmental regulations, over three-quarters of them had no response to offer. Generally this was because the firm either had little exposure to the permitting process or because the permits had been processed in a routine manner. Of those who did respond, 75 percent came from six industries: machinery, electrical equipment, chemicals, furniture, textiles and food. This reflects both the mix of firms locating in the three states and the degree to which they are affected by environmental regulations.

The most frequent request was for regulators to provide more and better information to industry. They want the rules spelled out crisply and clearly at the beginning of the firm's planning process, especially in new areas of regulation such as hazardous waste, where neither federal nor state agencies have yet developed set procedures to follow. Respondents also asked that the amount of "red tape" be cut, although they seldom suggested specific ways in which this might be accomplished. Some felt that environmental controls had reached the point where private costs were greater than the public benefits obtained, calling for more of a cost-benefit approach to regulation. A related comment was that industry should be allowed greater freedom in applying technologies to meet performance standards rather than being

required to follow a governmentally approved process.

The fourth most frequent comment, "regulations are not a problem, administration is satisfactory," stands apart from the other recommendations in that the firms took the time to state that the process had worked well for them.

In sum, the great majority of the respondents were basically satisfied with the system and felt environmental regulations were no more cumbersome than most other aspects of running a business. Overall, management seems quite interested in complying with both the spirit and the letter of the law and welcomes cooperation between government and industry.

## I. INTRODUCTION

The primary purpose of this study was to determine whether environmental factors--both environmental quality and state regulations designed to protect environmental quality--have influenced industrial site selection decisions in the Southeast. In the past several years a national trend has emerged as individuals and firms migrate toward the "Sunbelt." North Carolina has benefited from this movement as more industries have located in the region. In order to maximize its share of regional growth and development, it has established a vigorous state industrial development program. This program will be most effective if it is grounded on accurate information about key factors firms consider in choosing new plant sites. Prior to this study, little information has been available about the impact of environmental quality and regulation on the site selection process.

Almost concurrent with the trend toward Sunbelt growth, a large-scale federal and state effort emerged to protect air and water quality and to control hazardous and toxic substances. Each of these programs involved the imposition of new regulations on industrial and other sources of pollution. Federal and state environmental programs may affect industrial location decisions in three principal ways. First, some environmental programs limit or prevent the growth of industrial discharges into the environment where environmental quality standards would be jeopardized and therefore have the potential of limiting industrial development. Second, environmental regulations may impose costs on industries--to install pollution control equipment and in applying and waiting for various environmental permits--which may lead firms to avoid sites where they would come into contact with the regulations. Third, administration of regulations--the time involved, complexity



of the process and other factors--may affect firms' evaluations of potential industrial sites and the states in which those sites are located. All of these factors may create advantages and disadvantages among the states in their efforts to attract new industrial development. Whether they actually do, however, has not been known.

As a consequence, environmental protection and industrial development goals are often viewed as being conflict. In North Carolina, while industrial development goals are important, it is also state policy that industrial development should not occur at the expense of the state's natural resources. Indeed, North Carolina's high quality environment may well be a key factor in attracting industry.

The North Carolina Department of Natural Resources and Community Development is the agency responsible for making policy recommendations about what the state should do to ensure long-term utilization of natural resources in the public interest. Federal policy is shifting toward allowing states increased flexibility to shape their environmental protection programs and so the states now, more than in the recent past, are in a position to develop state plans which integrate industrial development and environmental protection objectives. In order to develop such an integrated strategy, however, more must be known about the interplay of environmental regulations and industrial siting decisions. With this knowledge, impediments to industrial siting may be indentified and where possible regulatory approaches which facilitate industrial growth may be adopted.

In order to provide the required information, two surveys were undertaken. First, state-level industrial development and environmental management personnel in North Carolina, South Carolina, and Virginia were interviewed

to identify environmental regulations and procedures which are currently in place and to determine whether rules and procedures differ significantly among the three states. Results of this survey are summarized in Appendix B, "Environmental Regulations in North Carolina, South Carolina, and Virginia." Second, officers with 204 firms which located industrial plants in North Carolina, South Carolina, and Virginia during the period January 1, 1977 through March 31, 1981 were interviewed to (1) determine criteria firms used in selecting a site in one of the three states, (2) pinpoint environmental permits and procedures which affected their site location decisions, and (3) identify industries which considered environmental quality in selecting a plant location. Results of this survey and analyses of the survey data are summarized in the following seven sections.

Section II examines findings from previous research on industrial location decisions and summarizes what is already known about the effects of environmental considerations on industrial location decision making. Three potential impacts are examined: whether environmental regulations have been found to affect the choice of a state in which to locate a plant; the choice of a particular site within a state, but not which state; or merely the choice of design for a plant but not the location. Although no studies directly examining these impacts were uncovered, several hypotheses are developed by analogy from what is known about various location factors, such as taxes, which may have effects similar to those of environmental regulations.

Section III describes procedures used in sampling firms and conducting interviews with company personnel in the UNC South Atlantic Industrial Facility Location Survey. The questionnaires used in the survey are reproduced in Appendix A.

Section IV uses the survey results to explore the industrial location decision process, focusing on the type of industrial growth--independent firms, new branch plants, plant expansions, and plant relocations--North Carolina has attracted during the period 1977-1981 and where within firms--national headquarters, regional or division headquarters, or plant management--the plant location decision was made. The firms' decision-making processes, in which regions, states, and sites within states are screened, is also described.

Section V reports industrial firms' assessments of the importance of various factors they considered in locating plants in North Carolina, South Carolina, and Virginia. Both business factors and factors related to environmental quality are examined. The importance firms attach to various business and environmental factors is compared across states in which plants were located and among firms representing different industrial groups and firms locating different size plants. This section concludes with an analysis of plant location choices among states, pinpointing factors which led firms to choose a site in one state versus other states which were considered during the plant location process.

Section VI examines industrial firms' experience with the environmental permitting process. The number and types of environmental permits which were obtained in locating new plants in North Carolina, South Carolina, and Virginia are reported, along with information about the manner in which firms conducted environmental analyses required for permits and their evaluations of the permitting process. Again, comparisons are made among firms locating plants in each of the three states studied, among firms locating different size plants, and among firms representing different industrial groups.



Section VII looks more closely at how environmental regulations affected firms' choices of sites and design of particular plants. The extent to which firms avoided sites because they could not meet environmental standards is reported, along with information regarding the extent to which cost and procedural factors (delays, data availability, ease of analysis, and state enforcement policy) played a role in industrial site selection decisions. The analysis of plant design and construction impacts focuses on the extent to which firms have had to change plant designs or have experienced construction delays as a result of state environmental regulations.

Section VIII, which concludes this report, summarizes key findings from the preceding analyses and presents industrial firms' suggestions and recommendations for improving regulatory processes.



## II. THE IMPORTANCE OF ENVIRONMENTAL FACTORS IN INDUSTRIAL SITE SELECTION: PREVIOUS RESEARCH

Environmental legislation over the past two decades has made pollution a significant economic factor in designing and siting industrial facilities. As a result, firms have made environmental considerations an important part of the decision process in constructing a new facility or expanding an existing one. From the point of view of North Carolina, one wants to know principally whether these regulations affect the choice of a state in which to site the facility, the choice of a particular site within the state but not which state, or merely the choice of a design for the facility but not the location.

Previous research in industrial location and environmental economics has shed relatively little light on the issue of state regulation and the firm's location decision. The choice of a site for a facility is a complicated one, approached more scientifically by some companies than others. Most research has concentrated on sorting out the numerous business factors and quality of life factors which are important. This existing body of knowledge provided a foundation on which the present study built and suggested ways in which environmental regulation interacts with other concerns.

The principal message to be gained from other industrial location surveys is that environmental regulation is not explicitly mentioned as an important consideration in choosing a site. In 1977, Fortune polled the top 1000 industrial concerns regarding their recent new facilities and their reasons for the states chosen. Table II-1 presents the factors cited by industry in order of importance. Transportation, proximity to customers, unskilled labor, energy supply and productivity were the top five concerns, while environmental regulation ranked only fifteenth, and waste treatment was



TABLE II-1

MOST IMPORTANT FACTORS IN PICKING LOCATION FOR A  
PLANT ACTUALLY LOCATED IN PAST 5 YEARS: 1977 FORTUNE SURVEY

Q. . . . which three to five factors were most important in choosing the location selected?

Factor	Percent of Firms
Efficient transportation facilities for materials and products	41
Proximity to customers	36
Availability of unskilled or semi-skilled workers	36
Availability of energy supplies	33
Productivity of workers	33
Community receptivity to business and industry	28
A growing regional market	26
Proximity to raw materials, components or supplies	26
State and/or local attitude toward taxes on business and industry	23
Costs of property and construction	22
Availability of skilled workers	17
Ample area for future expansion	17
Proximity to other company facilities	13
Water supply	11
State and/or local posture on environmental controls and processing of Environmental Impact Reports	11
Financing inducements	11
Availability of technical or professional workers	10
Proximity to services	8
Fiscal health of state and/or city	4
Adequate civic waste treatment facilities	4
Style of living for employees	4
Calm and stable social climate	4
Efficient transportation facilities for people	3
State and/or local personal income tax structure	2
Personal preferences of company executives	2
Availability of clerical workers	1
No answer	5
Average number of factors cited	4.5
Number of companies	406

Source: Fortune (1977).

twentieth. However, this may understate the importance of these last factors. The most desired characteristics might be present at many sites in a number of states, while such factors as water supply, waste treatment and environmentally suited sites might be the limiting ones. For example, the Northeast has the best transportation network and proximity to customers, the top two factors, yet the Fortune survey found that only 11 percent of new plant locations were in the Northeast, compared with 52 percent in the South. North Carolina and Virginia together had as many new plants as the entire Northeast. Clearly, companies are comparing whole bundles of characteristics of different potential sites, and it is difficult to determine which individual characteristics are the decisive ones. With this in mind, the survey conducted for this study was designed to ask firms how their chosen site compared with the next best one, in order to compare individual components of the bundle of characteristics.

In measuring the importance of environmental factors in site selection, the most significant issue which has been overlooked in the past is the interaction or multiple dimension of some factors. Interaction occurs between such characteristics as "state's attitude toward business," "social climate," "labor climate" and "labor productivity." Workers are an integral part of a state's political climate, so labor productivity and state attitude toward business are not independent but are part of the same consideration. As a result, a high ranking for productivity may indicate also a positive business attitude toward the general regulatory climate of a state. In order to capture the multidimensional aspect of some location factors, the survey undertaken for this study included open-ended questions concerning a firm's general experience with the state chosen for a facility and the characteristics of the state which were valued most highly.

Roger Schmenner (1980) surveyed the Fortune 500 regarding their new and expanded plants in the 1970's. He found that location factors differed markedly by industry group. See Table II-2. "Favorable labor climate" was the most important factor for all industry, with environmental permits ranking seventh. There seems to be a major interaction between labor climate and environmental permits for industries such as specialty chemicals/metals and forest-tied. Schmenner's research strongly indicates that business firms, especially large companies, look very closely at a number of characteristics in choosing a state or region for a new facility. They tend to trade off market proximity and transportation primarily for labor productivity, labor climate and the ability to find adequate sites, which includes environmental issues.

There is another way in which environmental location issues are concealed in other factors. The movement of industry out of the manufacturing belt of the Northeast and North Central states into the South and West has been accelerated somewhat by zoning policy in northern communities. Older, more densely developed cities have made it increasingly difficult for larger plants to find suitable sites in urban areas. The strategy of "fiscal zoning" followed by many suburban communities discriminates in favor of clean, quiet industries and against those with pollution problems. The way in which this shows up on industrial location surveys is primarily in an expressed preference for "land availability," "room for expansion" and to some extent "availability of existing facilities." The high ranking given these factors can be interpreted partly as responses to environmental regulation as it affects land availability in different parts of the country.

A final inference concerning the possible effects of environmental regulations can be obtained by comparing them with business taxation. Regulations are similar to taxes in the perception of business. Regulations differ in



TABLE II-2

REGION/STATE LOCATION CONSTRAINTS NOTED BY SIMILARLY CONSTRAINED INDUSTRIES FOR PLANT OPENINGS

Constraint	Percent of Firms Citing Constraint by Type of Industry									
	Agriculture Tied	Market Sensitive	Forest Tied	Labor Cost Sensitive	Heavy Chemicals/ Oils/Rubber Glass	Specialty Chemicals Metals	Heavy Metals	Industrial Machinery, Transport Equipment	High Technology	
Near Market	55.6	77.5	75.0	45.5	64.3	42.9	100.0	35.7	3.4	
Near Supplies, Resources	33.3	25.0	50.0	27.3	50.0	25.0	25.0	21.4	13.8	
Favorable Labor Climate	44.4	67.5	50.0	72.7	57.1	100.0	100.0	85.7	69.0	11
Low Labor Rates	11.1	25.0	12.5	45.5	7.1	42.9	0.0	38.1	37.9	11
Attractive Place for Engineers/ Managers to Live	11.1	20.0	0.0	36.4	28.6	28.6	5.0	40.5	62.1	
Near Existing Facilities of Company/Division	11.1	10.0	12.5	27.3	35.7	28.6	0.0	23.8	44.8	
Environmental Permits	33.3	15.0	25.0	0.0	21.4	57.1	0.0	11.9	13.8	
Number of Plants in Group	9	40	8	11	14	7	4	42	29	

Source: Schmenner 1980, p. 299.

their cost between states because it is more expensive to meet requirements at some sites than others and because different lead times to obtain permits can have a noticeable effect on the present value of an investment at different sites. The responsiveness of business to tax differences between states can give some indication of how responsive they may be to differences in the cost of meeting environmental regulations. Dennis Carleton (1979) studied differences in the number of new industrial facilities in a sample of urban areas. Taxes were included along with wages, labor supply, energy cost and other economic variables. The unique feature of Carleton's study was his separate estimation of the determinants of new branch plants and new single establishment firms. The single establishment firms, which were mostly small and locally-owned, showed a strong negative influence from taxes; that is, fewer new firms were established in high tax areas. But the larger branch plants showed little effect from tax differences, presumably because other economic factors were more important in their location decisions. To the extent that environmental regulations are similar in their effect to taxes, the survey conducted for this study has been organized to separate out large firms and small firms, branches and single establishment firms. If most of the new facilities in North Carolina are branches, and if branches receive the majority of environmental permits, then Carleton's work would suggest that the impact of regulation is much smaller than if independent, small firms predominate and receive the most permits.

### III. THE UNC SOUTH ATLANTIC INDUSTRIAL FACILITY LOCATION SURVEY

As noted in Section II, previous research on the impact of environmental regulations on specific industrial location decisions has been spotty at best. Perhaps because of the paucity of hard information, public debate on the environmental quality versus economic development issue continues to occur. In this atmosphere, it is not surprising that policy on this issue often seems either to be based on speculation or to be founded on the experiences of one or two major firms' location decisions that happen to generate discussion.

The present study was designed to put in perspective the question of how programs aimed at protecting the environment affect industrial development, positively or negatively, in North Carolina. Data to answer this question were obtained from a survey of key decision makers of manufacturing firms which have located in the South Atlantic region over the last several years. North Carolina's neighbors and industrial competitors, South Carolina and Virginia, were included in the survey to serve as benchmarks for assessing North Carolina's strengths and limitations in natural resource protection and economic growth as they affect the location of new industrial facilities.

The UNC South Atlantic Industrial Facility Location Survey consisted of two basic parts. Part I was designed to indicate how selected environmental factors rate in importance compared to other business and quality of life considerations when a firm is deciding to locate or expand a facility. Part II of the survey focused on the firms' experiences with specific environmental permits and regulations. In this section, the procedures followed in selecting the sample and designing and conducting the survey are described in more detail.



### Selecting the Sample

Because of budgetary and time constraints it was not possible to survey all firms that had located in the entire Southeast; thus the survey focused on three states, North Carolina, South Carolina, and Virginia. Similarly the time period for location decisions was limited to plant location announcements made between January 1, 1977 and March 31, 1981. For dates earlier than 1977, it was reasoned that it would be difficult to track down decision makers who were involved in or familiar with the plant location decisions. Moreover, environmental rules are continually changing, and questions or recommendations based on events that transpired more than four years ago run the risk of being obsolete.

In order to construct a sample frame of industrial location decisions, lists maintained by each state for new plants and expansions and the states' industrial directories were obtained. These state listings indicated that a total of 1,287 new industrial facilities were located in the three-state South Atlantic Region during the study time period. See Table III-1. The state lists were based on information from news releases, industrial developers, chambers of commerce, employment agencies, and other agencies. Although the lists do not purport to be 100 percent comprehensive, they are the best public record of new industrial facilities that is available. From these lists it was decided to survey all large new plants (250 employees or more) that had located in the region. This size firm typically gets the most publicity and is frequently the branch of a major U.S. corporation. Two other groups of firms were also selected for the survey. All firms that announced major expansions were included on the assumption that a plant making major additional expenditures could elect to go elsewhere if it were so motivated. A major expansion was defined as an announcement stating that 250

TABLE III-1

UNC SOUTH ATLANTIC INDUSTRIAL FACILITY LOCATION SURVEY:  
SURVEY SAMPLE

Indicator	Total	Number of New and Expanded Industrial Facilities		
		North Carolina	South Carolina	Virginia
<u>Total Number of New Facilities</u> <sup>a</sup>	1287	755	313	219
<u>Survey Sample</u>				
All Large Plants <sup>b</sup>	113	53	36	24
Random Sample of Small Plants <sup>c</sup>	150	90	35	25
All Large Expansions <sup>d</sup>	<u>54</u>	<u>27</u>	<u>18</u>	<u>9</u>
Total Survey Sample	317	170	89	58

<sup>a</sup>For the period January 1, 1977 through March 31, 1981.

<sup>b</sup>Anticipated employment of 250+ employees.

<sup>c</sup>Proportion sampled in each state is based on share of small plant growth in state for the period.

<sup>d</sup>Based on announced added employment of 250+ employees.

or more new employees would be added. Finally, a random sample of firms in each state was made of smaller facilities (less than 250 employees). Smaller firms have traditionally been ignored in location surveys, but recently there has been a growing recognition that small firms in aggregate actually generate the majority of new jobs created each year (see Birch 1979). It was hypothesized that small plants may have different experiences with environmental regulations than large plants. Because of time constraints and the labor intensity of the survey process (see below), it was necessary to limit the number of

small plants surveyed to 150, a little less than half of the total. The number of small firms sampled was distributed among the three states based on their proportional share of small plant growth during the period studied.

### The Survey Instrument

As noted above, the survey consisted of two parts. Part I (see Appendix A) is basically a traditional industrial location survey in which the respondent is asked to rate the importance of a number of key business factors in making the firm's location decision. Questions 1 to 9 provided background information on the firm and the nature of the firm's industrial process. The lists used for "business factors" and "community quality of life factors" are an amalgamation taken and adapted from previous surveys and studies (see Fortune, 1977; Moriarty, 1980; Tong, 1979; and Ziehr, 1975.)

Part I of the South Atlantic Survey differs from other efforts in that the business factors were separated from the quality of life factors, rather than presenting respondents with one long list. In addition a number of environmental factors were added (e.g., "state/local environmental regulations and permit processing," and "physical quality of air and water resources") that do not appear in this level of detail in most surveys. Most of the factors listed are self explanatory, but it should be noted that all of them require a subjective evaluation by the respondent. In this sense, the survey is impressionistic in nature; however, it is the collective sum of these impressions that ultimately determines where a plant locates. It should also be noted that each of the factors is not necessarily distinct. Terms such as "industrial climate" are very broad and mean many things to different people. For example, this term may capture the availability of state tax and financial incentives, but it might also incorporate a low level of



unionization and a right to work environment, or the fact that the decision makers liked the people they came into contact with in a particular state.

The survey also differs from previous undertakings in that it attempts to differentiate the site actually selected from alternative sites considered. The location decision process is discussed more fully in Section V, but suffice it to say there is some evidence that a decision maker has certain fundamental requirements of all sites considered in a region. Assuming that several sites meet those basic requirements, however, it is then possible for a more marginal consideration to tip the scales in favor of one site over another.

Part I of the survey concludes by asking the respondent to speculate where the firm would most like to locate a new plant within the next year.

Part II of the survey shifts focus and asks the respondents if they had to obtain environmental permits to operate or construct the facility. See Appendix A. This question is followed by inquiries of how analyses were done to receive the permits and how the permits affected the cost and timing of the opening of a given facility. Part II concludes with an open-ended question concerning the respondents' recommendations on how to improve the environmental management process.

### The Survey Process

The procedure used to administer the survey was based on the need to get a high response rate with high quality answers from the right people. Mailing lists of key people who were involved in their company's site selection process are not readily available. Therefore, the survey team's initial contact with firms was with a representative listed in each state's industrial directory of manufacturing firms.

A traditional mail survey was ruled out because the representative listed in the directory, typically a plant manager, would not necessarily be the appropriate individual to complete the questionnaire. As an alternative, the survey team elected to mail out Part I of the survey to the listed representative of the firm together with a cover letter (see Appendix A) on the letterhead of the University of North Carolina School of Business Administration. The cover letter explained the purpose of the survey and requested that if necessary the survey be forwarded to the appropriate individual in the firm. Because of the policy nature of the study, the best person to interview was an executive or manager rather than a technician. This letter in turn was followed by a phone call to the listed representative of the firm. Ideally, at that time Part I was quickly recorded over the phone, and then the questions from Part II were asked. Only Part I was sent to the representative in advance so that respondents' answers would not be influenced by their awareness of the environmental focus of the study (which was self-evident from the nature of the questions asked in Part II). By using the phone, the survey team was assured of eventually tracking down the right person to interview and could also have greater confidence that the responses had been thought through and were accurate.

Part I of the survey and the cover letter were mailed in batches of 40 to 60 a week during the period from late July to early September 1981. All interviews were conducted by one of the members of the survey team. Because of inaccuracies in the directories, changes in job assignments, and the busy schedules of the managers to be interviewed, it typically took five or six calls to a firm before an interview actually could be completed. Moreover, about half of the firms required follow-up mailings because the original forms were never received, were thrown away, or were sent to the

wrong person. Some deviations were necessary in the survey process to accommodate some managers who were particularly busy and preferred not to engage in a sometimes lengthy phone interview. (Interviews typically ran from 10 to 30 minutes.) In these cases the respondents were allowed to return the completed surveys by mail. Respondents who had promised to mail in completed surveys but had neglected to do so were sent a reminder letter. The survey process was completed by the beginning of October 1981.

### The Data Base

Files were set up for each firm and coded for computer processing with a unique identification number to protect the confidentiality of the participants. Table III-2 summarizes survey response rates for North Carolina, South Carolina and Virginia. Overall, managers representing almost two-thirds of the 317 firms sampled were interviewed. North Carolina's high response (68 percent) can be attributed in part to the location of the School of Business Administration in that state. Virginia's lower rate (50 percent) resulted, in part, from the random chance of having a proportionately higher number of firms selected that are now out of business.

Table III-2 also summarizes the major reasons why firms were not included in the final tabulations. Only about 7 percent of the firms refused to participate in the study. The out-of-business category understates the percentage of firms that actually went out of business during the period, because a number of out-of-business firms were dropped from the sample when the study team was verifying or obtaining names, addresses, and phone numbers. The inclusion of firms that should not have been included reflects both the difficulty of maintaining accurate lists at the state level and the fact that as economic conditions change some firms retract announcements of new



TABLE III-2

UNC SOUTH ATLANTIC INDUSTRIAL FACILITY LOCATION SURVEY:  
RESPONSE RATE AND REASONS FOR NONRESPONSE

Indicator	Total	North Carolina	South Carolina	Virginia
<u>Response Rate</u>				
Total Sample	317	170	89	58
Completed Interviews	204	116	59	29
Response Rate	64%	68%	66%	50%
-----				
<u>Reasons for Nonresponse (frequency)</u>				
Refused to Participate	22	7	10	5
Out of Business	16	7	3	6
Did Not Return Survey in Mail <sup>a</sup>	42	21	11	10
Should Not Have Been Included in Original Survey <sup>b</sup>	25	16	4	5
Other	8	3	2	3
-----				
<sup>a</sup> Phone contact was made to representative of firm, and it was confirmed that a copy of the questionnaire was received. Reminders were sent, but no response was received.  <sup>b</sup> Includes major expansions that were really "minor," changes in ownership only, and non-manufacturing facilities such as warehouses and service centers.				
-----				

plants or expansions that they once intended to make. The largest category of non-respondents (13 percent) includes those who indicated they would complete surveys but either failed to return them or else returned them after the deadline for responses.

In sum, the quality of the data base is about as good as could be expected for a survey of this kind. Nevertheless, the data do have limitations. Again, it should be kept in mind that the survey is based on subjective evaluations and recollections of decision makers. As such, this study focuses on the perceptions of how the decision makers approached the plant location process. Sometimes perceptions differ from reality. Nevertheless, perceptions do shape the decision makers' future decisions.

The survey team was sensitive to the charge that interviews of decision makers might result in respondents telling the interviewers what they thought the surveyor wanted to hear or what they thought would make their firm look good in the public eye. The survey instrument was designed to avoid this problem by approaching similar questions from a variety of perspectives. The guarantee of confidentiality also led to greater candor on the part of the respondents. As a result, most of the respondents were quite open and attempted to give an objective description of why they located industrial facilities where they did.

### Interpreting the Results

In the following chapters a large number of tables are presented summarizing the major results of the survey. When reviewing these results keep in mind that the survey focused solely on the location decisions of relatively new manufacturing plants. Even though older plants are probably a greater source of environmental pollution than newer facilities (because of outmoded technology) these plants were not included in the survey because they did not involve a recent siting decision. Similarly, only manufacturing facilities were considered. New service firms, wholesalers, retailers, governmental agencies, headquarters, and other business operations were excluded. Although such operations produce a large number of jobs and have important

land use impacts, they generally do not require any of the major environmental permits.

The reader should again be reminded that the respondents to the survey were decision makers. Thus, the results are most useful on a policy level. This is especially true for Part II of the survey dealing with environmental management issues. Although the decision makers interviewed were generally familiar with the basics of the environmental regulations, they were not always aware of the precise mechanics of a particular environmental permit. To make valid recommendations at that level of detail, separate indepth case studies with the environmental engineers and specialists who actually prepare the permit applications would be necessary.

In reviewing the tables in this report the reader will note that the number of firms responding varies from table to table. Generally this is because all firms did not respond to all questions because in a few instances they elected not to respond to some questions and in other cases they did not feel they could give accurate responses. As the data set is subdivided by state, industry group, and size of firms the number in a given sample decreases. Statistically, sample sizes of less than 30 are less reliable than larger samples. The sample is given in most tables as an aid to readers in interpreting results.

The 1 to 5 scale used to rank location factors also merits a word of explanation. A low score means only that a given factor was relatively unimportant in the location process. Thus water supply, for example, might rank low not because the firm did not need water but because water was universally available in the areas the firm was considering.



#### IV. THE INDUSTRIAL LOCATION DECISION: THE KEY ACTORS AND THE PROCESS

Industrial site selection is a complex process. It is complicated first of all by the myriad economic and social factors which can vary widely within the region. It is further complicated by the numerous layers of management responsibility in many companies. Most of the facilities in the South Atlantic survey were owned by corporations which operated plants in more than one state. As a result, they have as many as three levels of management making the site selection decision: national headquarters, regional or division headquarters, and plant management.

Most surveys of industry location find that small firms, especially those with only one establishment, have a much narrower focus for their site selection than large companies with plants in several states. Most of the small firms consider sites in only one state, and a large percentage look at just one site, usually close to the founder's place of residence. Large firms, on the other hand, are becoming increasingly sophisticated at compiling data on many sites and making the selection on the basis of many characteristics. The implication for environmental management is that out-of-state firms looking at sites in several states are more likely to base location decisions on real or perceived differences among states in the permitting process than are firms which have a local origin. It could be said that the competition North Carolina faces increases with the distance of a firm's headquarters from the state.

An important characteristic of the new and expanded facilities that were surveyed for this report is that the great majority of them are

headquartered out-of-state. Table IV-1 presents all North Carolina facilities in the survey by type of new employment and by in-state versus out-of-state headquarters. Most of the plants surveyed were new branches rather than headquarters (68 of 116, or 59 percent). Headquarters for these branches are out-of-state in 78 percent of the cases (53 out of 68), and 64 percent of all plants are out-of-state owned (74 out of 116). Two independents are out-of-state owned because they are subsidiaries, but company headquarters is in the single North Carolina facility. In the case of relocations, four moved their headquarters to North Carolina, while the other six were only relocating a branch into the state.

The survey also asked explicitly where the site location decision had been made, whether at the plant level or at regional or national headquarters.

TABLE IV-1  
NORTH CAROLINA FACILITIES BY TYPE OF  
GROWTH AND HEADQUARTERS LOCATION

Location of Firm Headquarters	Number of Industrial Facilities by Type of Growth				
	Independent <sup>a</sup>	New Branch	Expansion	Relocation	Total
Located Within North Carolina	16	15	7	4	42
Not Located Within North Carolina	<u>2</u>	<u>53</u>	<u>13</u>	<u>6</u>	<u>74</u>
Total	18	68	20	10	116

<sup>a</sup>Single establishment firm.

Table IV-2 shows the number of decisions made at the different levels for the 116 North Carolina facilities which responded to this survey. In some cases respondents indicated that several management levels were involved in the decision, but national headquarters was most often making the basic decision. Table IV-2 confirms that the majority of location decisions are made at the top, and from Table IV-1 it is evident that the top is often outside of the state.

TABLE IV-2  
WHERE THE SITE DECISION WAS MADE  
FOR NORTH CAROLINA FACILITIES

Location of Decision Maker	North Carolina Industrial Facility Location Decisions	
	Frequency	Percent
Plant Personnel	28	24
Regional Headquarters	14	12
National Headquarters	72	62
Other	2	2
Total	116	100

The picture which emerged from telephone interviews with management was one of a multi-stage decision process. The larger firms decide first on the region of the country that suits them best. Next, sites in several states are studied using a long list of "needs" and "wants." Finally these are narrowed down to a small number of sites (between two and five) that satisfy a significant number of the looked-for characteristics. The choice of a



region is made fairly early in the process, so that North Carolina usually appears to be in competition only with other states in the Southeast rather than with states throughout the nation. It would be very difficult to determine how North Carolina compares to Texas or Oregon, because those comparisons seem to be done on the basis of regional rather than state characteristics.

Most out-of-state headquarters for North Carolina facilities in the survey are located in the Northeast and North Central states. Table V-3 gives the headquarters location of the 71 plants in North Carolina for which this information was obtained. Most plants in food products, textiles, apparel, furniture and tobacco are owned by firms within the region, while plants in chemicals, fabricated metal, machinery and electronics are typically owned by firms headquartered outside of the region. This latter group is dominated by firms headquartered in the Northeast and North Central regions. They typically operate plants both in the older manufacturing belt and in the Southeast. North Carolina is mainly in competition with states such as South Carolina and Georgia for these plants.

TABLE IV-3

HEADQUARTERS STATE FOR NEW BRANCH PLANTS, PLANT  
EXPANSIONS, AND PLANT RELOCATIONS LOCATING IN  
NORTH CAROLINA: 1977 - 1981<sup>a</sup>

Headquarters State	Frequency	Percent
<u>Mountain</u>	4	6
Arizona	1	1
Idaho	1	1
Wyoming	2	3
<u>North Central</u>	29	41
Iowa	1	1
Illinois	4	6
Indiana	2	3
Kansas	2	3
Michigan	9	13
Missouri	2	3
Ohio	9	13
<u>Northeast</u>	25	35
<u>New England</u>	8	11
Connecticut	4	6
Massachusetts	4	6
<u>Middle Atlantic</u>	17	24
New Jersey	3	4
New York	11	16
Pennsylvania	3	4
<u>South Atlantic</u>	5	7
Georgia	2	3
Maryland	2	3
Virginia	1	1
<u>South Central</u>	3	4
Mississippi	1	1
Tennessee	1	1
Texas	1	1
<u>Foreign</u>	1	1

<sup>a</sup>Excluding firms headquartered in North Carolina





## V. THE ROLE OF BUSINESS AND QUALITY OF LIFE FACTORS IN THE INDUSTRIAL LOCATION DECISION PROCESS

A key objective of this study was to determine the relative impact of environmental considerations on industrial facility location in North Carolina. The data collected in the UNC South Atlantic Industrial Facility Location Survey can be analyzed in a number of different ways to address this issue. This section focuses on industrial firms' assessment of factors considered in locating plants in North Carolina, South Carolina, and Virginia. Locational decision factors are analyzed to identify differences among types of industries, firms locating different size plants and firms locating in each of the three states studied.

### Firms Locating in North Carolina, South Carolina, and Virginia

The conventional way to organize manufacturing goods by product groups is through the United States Standard Industrial Classification (SIC) system. At the four-digit level the SIC system is quite detailed. Code 2328, for example, includes "men's, youths', and boys' work clothing." Because of the diversified growth of the South Atlantic region over the last four years a breakdown by industry groups at the four-digit SIC level would not be very meaningful. Typically only one or two firms would appear in each category, and many categories would not be represented at all. For the purposes of this study, data are presented on the two-digit level, which includes 20 industry groups. Thus a firm making work clothing would be reported in code 23, the apparel industry.

Table V-1 tabulates plants represented in the survey by industry groups. Note that the top five industry groups accounted for 53 percent of the respondents in the survey. The top five industry groups were SIC 35,

TABLE V-1

DISTRIBUTION OF PLANT LOCATION DECISIONS STUDIED  
BY STATE AND INDUSTRY

Industry (SIC Code)	Number and Percent of Facilities Studied							
	All Facilities		North		South		Virginia	
			Carolina		Carolina			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Food (20)	11	5.5	5	4.7	1	1.8	5	17.2
Tobacco (21)	4	2.0	3	2.8	0	0.0	1	3.5
Textiles (22)	16	8.0	10	9.4	4	7.1	2	6.9
Apparel (23)	13	7.0	7	6.5	5	8.9	1	3.5
Lumber (24)	6	3.0	5	4.7	1	1.8	0	0.0
Furniture (25)	10	5.0	8	7.5	2	3.6	0	0.0
Paper (26)	3	1.0	3	2.8	0	0.0	0	0.0
Printing (27)	4	2.0	1	0.9	1	1.8	2	6.9
Chemicals (28)	16	8.0	9	8.4	5	8.9	2	6.9
Petroleum (29)	1	0.5	1	0.9	0	0.0	0	0.0
Rubber/Plastic (30)	9	4.5	3	2.8	6	10.7	0	0.0
Leather (31)	0	0.0	0	0.0	0	0.0	0	0.0
Stone, Clay (32)	4	2.0	1	0.9	1	1.8	2	6.9
Primary Metals (33)	4	2.0	0	0.0	4	7.1	0	0.0
Fabricated Metals (34)	16	8.0	9	8.4	6	10.7	1	3.5
Non-electrical Machinery (35)	33	17.0	18	16.8	12	21.4	3	10.3
Electrical Machinery (36)	21	12.0	12	11.2	4	7.1	5	17.2
Transportation Equipment (37)	11	6.0	8	7.5	0	0.0	3	10.3
Instruments (38)	4	2.0	1	0.9	2	3.6	1	3.5
Miscellaneous (39)	4	2.0	2	1.9	1	1.8	1	3.5
Total	190	100.0	106	100.0	55	100.0	29	100.0

non-electrical machinery; SIC 36, electrical machinery and equipment; SIC 34, fabricated metal products; SIC 22, textiles; and SIC 28, chemicals. Each of the states studied differed somewhat in the industrial groups it had attracted. Nonelectrical machinery plants were among the top five industry groups attracted to each state. Electrical machinery and textiles ranked among the top five industries attracted to North Carolina and Virginia over the study period, but not to South Carolina. Fabricated metals and chemicals were among the top five industrial groups attracted to North Carolina and South Carolina, but not Virginia. South Carolina attracted a higher proportion of rubber and plastic plants than North Carolina or Virginia, while Virginia attracted a much higher than average proportion of food processing plants. In general, the data summarized in Table V-1 indicate clearly that North Carolina is in competition with one or both of its neighboring states for new plants in most of the major industrial groups most likely to select a site in the South Atlantic region.

Table V-2 shows the actual distribution of plants locating in North Carolina by industry grouping for the period January 1, 1977 through March 31, 1981 as listed by the North Carolina Department of Commerce. The actual distribution is similar to the sample distribution with a few notable exceptions.

As discussed in Section III, large plants were deliberately over sampled for this study. Thus, industries that tend to build large facilities, such as the tobacco, machinery, electronics, and transportation industries are overrepresented in the survey. Similarly, plants in industries that have a large number of smaller operations, such as apparel, are underrepresented. Other discrepancies between the sample and reported listing exist because of information gained in collecting the data and because some firms listed by the state went out of business during the period.



TABLE V-2

DISTRIBUTION OF NEW PLANTS LOCATING IN NORTH CAROLINA FROM  
JANUARY 1, 1977 THROUGH MARCH 31, 1981

Industry (SIC Code)	All New Plants Listed <sup>a</sup>		New Plants Included in the Study	
	Number	Percent	Number	Percent
Food (20)	31	4.1	5	4.7
Tobacco (21)	2	0.3	3	2.8
Textiles (22)	81	10.8	10	9.4
Apparel (23)	95	12.6	7	6.5
Lumber (24)	53	7.0	5	4.7
Furniture (25)	41	5.4	8	7.5
Paper (26)	27	3.6	3	2.8
Printing (27)	9	1.2	1	0.9
Chemicals (28)	35	4.6	9	8.4
Petroleum (29)	4	0.5	1	0.9
Rubber/Plastic (30)	58	7.7	3	2.8
Leather (31)	5	0.7	0	0.0
Stone, Clay (32)	24	3.2	1	0.9
Primary Metals (33)	18	2.4	0	0.0
Fabricated Metals (34)	65	8.6	9	8.4
Non-electrical Machinery (35)	98	13.0	18	16.8
Electrical Machinery (36)	57	7.6	12	11.2
Transportation Equipment (37)	27	3.6	8	7.5
Instruments (38)	14	0.2	1	0.9
Miscellaneous (39)	<u>11</u>	<u>0.2</u>	<u>2</u>	<u>1.9</u>
Total	753	100.0	107	100.0

<sup>a</sup>As reported by the North Carolina Department of Commerce. Does not include expansions.

Business Location Factors

Table V-3 summarizes the ranking of 19 business location factors for all firms locating in the South Atlantic region. The rankings are based on the mean of the rating (on a 1, not important to 5, extremely important scale) given to each factor by firms locating new plants during the study period.

The top five factors for all firms were: (1) state/local industrial climate; (2) labor productivity; (3) transportation; (4) land availability/room for expansion; and (5) cost of land and construction. The appearance of industrial climate as the number one factor is not particularly surprising, and it is the only one of the business factors which appeared in the top five factors of each major industry group. Business climate is actually a composite of a number of factors that may include such items as state debt per capita, labor union membership, man hours lost per year because of work stoppages, state spending on highways, and various financial programs. Implicitly this factor overlaps with some of the others on the list. Clearly the industrial climate of all three of the states surveyed is considered quite good. A 1980 study, Manufacturing Business Climates by Alexander Grant & Company, rated North Carolina second, South Carolina third, and Virginia fourteenth nationally for their business climates.

Similarly, labor productivity, too, incorporates many considerations. On the other hand, transportation and land availability and cost tend to be much more site specific.

The business factors associated with the environment were all of slight to moderate importance in plant location decisions (location scores between 1.9 and 2.9), even though they ranked lower than many business factors. Thus, out of the 19 business factors considered, state/local environmental regulations and permit processing ranked 13th overall; water supply ranked 14th; public wastewater treatment capacity ranked 17th; and solid/hazardous waste disposal facilities ranked 19th.

TABLE V-3

RANKING OF KEY BUSINESS LOCATION FACTORS

Business Location Factors	In considering the location of this facility, how important were the following business factors? Please rate each of these business factors on the five-point scale...1-not im- portant....5-extremely important....	
	Mean Score	Rank
State/Local Industrial Climate	3.9	1
Labor Productivity	3.8	2
Transportation	3.6	3
Land Availability/Room for Expansion	3.6	4
Cost of Land and Construction	3.4	5
Wage Rate	3.3	6
Business Taxation	3.3	7
Electricity Availability/Cost	3.2	8
Skilled Labor Supply	3.2	9
Proximity to Suppliers/Services	3.1	10
Proximity to Markets	3.1	11
Unskilled Labor Supply	2.9	12
State/Local Environmental Regulations and Permit Processing	2.9	13
Water Supply	2.8	14
Availability of Technical Training Programs	2.8	15
Fuel Availability/Cost	2.7	16
State Financial Incentives	2.5	17
Public Wastewater Treatment Capacity	2.3	18
Solid/Hazardous Waste Disposal Facilities	1.9	19
Number of Facilities	194	



A number of other business factors were occasionally suggested by respondents--specifically right to work laws, availability of a building at a good price, and proximity to other corporate facilities. In effect the right to work factor is incorporated into both industrial climate and labor productivity. The other two factors noted are indirectly accounted for in land availability and cost.

The composite averages for all firms conceal some important differences among industry groups. See Table V-4. Environmental regulations, for example, are the fourth most important consideration for the chemicals industry, and water supply is the sixth most important factor for that industry. Public wastewater treatment capacity is the fifth most important factor to the textiles industry. On the other hand, public wastewater treatment capacity is ranked 19th for the chemicals industry, because those firms generally operate their own wastewater treatment facilities.

The differences among industry groups suggest that broad brush industrial development policies may not be effective and that the particular needs of the target industry group should be assessed before existing policies are modified.

Table V-5 ranks the 19 business factors by state. Note that the state/local industrial climate, labor productivity, and land availability were among the top five factors for all three states. In North Carolina skilled labor supply was also an important consideration. The rankings for environmentally related business factors were quite similar among the states. State/local environmental regulations, for example, ranked 13th or 14th for each of the states, and solid/hazardous waste disposal facilities ranked 19th in each case. Although there are differences among the states on how the business factors are ranked, at least part of this difference is based on

TABLE V-4

## RANKING OF BUSINESS LOCATION FACTORS BY MAJOR INDUSTRY GROUPS

Rank by Industrial Group (SIC Code)										
Business Location Factors	Rank by All Firms	Rank by Industrial Group (SIC Code)								
		Textiles (22)	Apparel (23)	Furniture (24)	Chemicals (28)	Rubber & Plastic (30)	Fabricated Metals (34)	Nonelectrical Machinery (35)	Electrical Machinery (36)	Transportation Equipment (37)
State/Local Industrial Climate	1*	2*	5*	3*	2*	4*	1*	1*	2*	1*
Labor Productivity	2*	3*	1*	2*	9	2*	7	2*	1*	2*
Transportation	3*	9	3*	7	1*	3*	9	4*	8	3*
Land Availability/Room for Expansion	4*	4*	8	1*	6	4*	4*	3*	4*	5*
Cost of Land & Construction	5*	1*	7	4*	3*	11	2*	5*	10	10
Wage Rate	6	6	3*	6	12	4*	9	7	3*	9
Business Taxation	7	13	6	7	6	9	2*	5*	11	5*
Electricity Availability/Cost	8	12	9	12	10	4*	6	8	9	8
Skilled Labor Supply	9	7	2*	4*	15	9	11	11	6	4*
Proximity to Suppliers/Services	10	14	10	16	13	13	11	10	13	10
Proximity to Markets	11	18	13	10	5*	1*	5*	12	15	10
Unskilled Labor Supply	12	8	15	11	14	8	15	16	7	13
State/Local Environmental Regulations and Permit Processing	13	9	12	13	4*	17	17	12	12	16
Water Supply	14	11	14	17	6	14	16	15	15	16
Availability of Technical Training Programs	15	17	19	18	18	10	8	8	5*	7
Fuel Availability/Cost	16	16	11	9	11	14	11	17	14	13
State Financial Incentives	17	15	17	14	14	16	14	14	17	13
Public Wastewater Treatment Capacity	18	5*	15	14	19	18	18	19	18	16
Solid/Hazardous Waste Disposal Facilities	19	19	17	19	16	19	19	18	19	19
Number of Facilities	194	14	13	10	15	9	17	34	22	11

\*Top five factors

TABLE V-5

RANKING OF BUSINESS LOCATION FACTORS BY  
STATE IN WHICH PLANT WAS LOCATED

Business Location Factor	Rank by All Firms	Rank by State		
		North Carolina	South Carolina	Virginia
State/Local Industrial Climate	1*	1*	1*	4*
Labor Productivity	2*	2*	2*	1*
Transportation	3*	3*	6	2*
Land Availability/Room for Expansion	4*	4*	3*	5
Cost of Land and Construction	5*	6	4*	6
Wage Rate	6	9	7	3*
Business Taxation	7	8	5*	9
Electricity Availability/Cost	8	7	8	12
Skilled Labor Supply	9	5*	15	10
Proximity to Suppliers/Supplies	10	10	10	7
Proximity to Markets	11	11	9	7
Unskilled Labor Supply	12	13	14	11
State/local Environmental Regulations and Permit Processing	13	14	13	13
Water Supply	14	12	16	15
Availability of Technical Training Programs	15	14	11	17
Fuel Availability/Cost	16	15	17	14
State Financial Incentives	17	18	12	18
Public Wastewater Treatment Capacity	18	17	18	16
Solid/Hazardous Waste Disposal Facilities	19	19	19	19
Number of Facilities	192	112	55	25

\* Top five factors.



differences in the industrial mix of the states rather than state policy.

As Table V-6 shows, there are also differences in the ranking of the business factors according to the size of the plant that was located. Thus while labor productivity and industrial climate were important in the location of all sizes of plants, skilled labor supply is a relatively unimportant site selection factor to firms locating small plants (under 50 employees). Proximity to markets, on the other hand, was of relatively greater importance in the location of small plants. (In interpreting these results, as noted at the beginning of this section, it should be remembered that industry groups are not uniformly distributed by size of plant being located.)

Environmental business factors also varied somewhat by size of plant. Environmental regulations were relatively more important in the location of small (ranked 8th) and large (ranked 10th) plants compared to medium-size (ranked 16th) plants. In the case of small plants, this may be a reflection of company managers' lack of experience with these regulations. In the case of large plants, it probably reflects the increased probability that the plants required environmental permits of various types and that the analysis required for those permits was more complex than for smaller plants. Water supply was also relatively more important in locating large plants (ranked 6th) than in locating medium-size (ranked 14th) or small (ranked 15th) plants. Again, larger plants are most likely to require large amounts of water and to be affected by water supply constraints of the communities in which they might locate.

#### Quality of Life Location Factors

Table V-7 considers the ranking of twelve community quality of life factors for all firms and for nine major industry groups. The top five factors for all firms were: (1) educational system; (2) cost of living;

TABLE V-6

RANKING OF BUSINESS LOCATION FACTORS BY SIZE OF  
PLANT LOCATING IN NORTH CAROLINA

Business Location Factors	Rank by All NC Firms	Rank by Size of Plant		
		Small (under 50 employees)	Medium (50- 249 employees)	Large (250 or more employees)
State/Local Industrial Climate	1*	1*	2*	1*
Labor Productivity	2*	3*	1*	3*
Transportation	3*	2*	6	5*
Land Availability/Room for Expansion	4*	6	6	2*
Cost of Land and Construction	6	4*	9	9
Wage Rate	9	10	3*	11
Business Taxation	8	8	8	11
Electricity Availability/ Cost	7	10	4*	6
Skilled Labor Supply	5*	9	4*	3*
Proximity to Suppliers/ Services	10	7	13	13
Proximity to Markets	11	5*	15	17
Unskilled Labor Supply	13	12	10	16
State/Local Environmental Regulations and Permit Processing	14	8	16	10
Water Supply	12	15	14	6
Availability of Technical Training Programs	14	18	11	8
Fuel Availability/Cost	15	14	12	15
State Financial Incentives	18	6	17	19
Public Wastewater Treat- ment Capacity	17	17	18	14
Solid/Hazardous Waste Disposal Facilities	19	19	19	18
Number of Facilities	112	41	34	37

\*Top five factors

TABLE V-7

## RANKING OF QUALITY OF LIFE FACTORS BY MAJOR INDUSTRY GROUPS

Community Quality of Life Factors	All Firms		Rank by Industrial Group (SIC Code)								
	Mean Score	Rank	Textiles (22)	Apparel (23)	Furniture (24)	Chemicals (28)	Rubber & Fabricated Plastic (30)	Fabricated Metals (34)	Nonelectrical Machinery (35)	Electrical Machinery (36)	Transportation Equipment (37)
Educational System	3.2	1*	1*	1*	2*	1*	2*	3*	1*	1*	1*
Cost of Living	3.0	2*	3*	2*	2*	3*	1*	1*	4*	4*	4*
Housing	3.0	3*	2*	4*	9	2*	8	4*	2*	2*	2*
Physical Quality of Air and Water Resources	2.8	4*	6	4*	4*	3*	2*	6	8	6	8
Personal Taxes	2.8	5*	11	6	4*	6	5*	2*	5*	4*	9
Recreational Opportunities	2.8	6	6	8	8	7	11	5*	7	2*	3*
Climate	2.7	7	4*	2*	9	7	7	8	6	6	6
Transportation (local traffic conditions/ public transportation)	2.6	8	5*	7	4*	3*	10	12	3*	10	9
Open Space	2.5	9	8	11	4*	9	5*	9	9	10	12
Cultural Resources	2.5	10	9	8	11	11	9	6	10	9	4*
Aesthetic Quality of Natural Landscape (scenery)	2.5	11	12	8	1*	12	4*	9	11	8	11
Entertainment	2.4	12	10	11	11	10	12	11	12	12	6
Number of Facilities		194	14	12	10	14	9	17	34	22	10
*Top five factors											

(3) housing; (4) physical quality of air and water resources; and (5) personal taxes. These five factors tended to rate highly among the various industry groupings as well although there is a significant range of responses. Part of the difference can be explained by the type (skilled, unskilled) and number of employees working in each industry group. Other differences are more difficult to explain. Scenery, for example, was the top rated factor for the furniture industry (possibly reflecting the tendency of these firms to locate in the hilly western third of North Carolina), while that same factor was rated last by chemical firms. A number of additional quality of life factors were mentioned by respondents, such as medical care facilities and the availability of a range of churches and other places of worship. Others commented on the general "livability" of the community. However, the most frequently mentioned additional response was that the owner was from the area and wished to remain near family and friends.

Table V-8 looks at the same community quality of life factors but divides them according to state. Once again education, housing, and cost of living are top rated for each of the three states, but in North Carolina the next two top factors are physical quality of air and water resources and recreational opportunities. In contrast, South Carolina's fourth and fifth factors are personal taxes and climate. Virginia managers also rated personal taxes as more important in their firms' location decision than did North Carolina managers. However, as Table V-8 indicates, none of these differences is large.

The variation of responses by size of plant being located is more dramatic, as shown in Table V-9. For firms locating small plants, open space, air and water quality, climate, and education were the top rated factors. In large measure these responses reflect the tendency of firms locating smaller



TABLE V-8

RANKING OF QUALITY OF LIFE FACTORS BY STATE IN  
WHICH PLANT WAS LOCATED

Community Quality of Life Factors	Rank by All Firms	Rank by State		
		North Carolina	South Carolina	Virginia
Educational System	1*	1*	1*	1*
Cost of Living	2*	3*	2*	4*
Housing	3*	2*	3*	2*
Physical Quality of Air and Water Resources	4*	4*	6	6
Personal Taxes	5*	6	4*	2*
Recreational Opportunities	6	5*	7	5*
Climate	7	6	5*	8
Transportation (local traffic conditions/ public transportation)	8	8	9	8
Open Space	9	8	10	7
Cultural Resources	10	11	8	10
Aesthetic Quality of Natural Landscape (scenery)	11	10	12	12
Entertainment	12	12	11	11
Number of Facilities	188	110	55	23

\*Top five factors

TABLE V-9

RANKING OF QUALITY OF LIFE FACTORS BY SIZE OF  
PLANT LOCATING IN NORTH CAROLINA

Community Quality of Life Factors	Rank by All NC Firms	Rank by Size of Plant		
		Small (under 50 employees)	Medium (50-249 employees)	Large (250 or more employees)
Educational System	1*	2*	1*	1*
Cost of Living	3*	5*	2*	3*
Housing	2*	6	3*	2*
Physical Quality of Air and Water Resources	4*	2*	4*	5*
Personal Taxes	6	10	5*	7
Recreational Opportunities	5*	6	7	4*
Climate	6	2*	6	11
Transportation (local traffic conditions/ public transportation)	8	8	10	6
Open Space	8	1*	11	9
Cultural Resources	11	12	8	10
Aesthetic Quality of Natural Landscape (scenery)	10	9	9	8
Entertainment	12	11	11	12
Number of Facilities	110	40	33	37

\*Top five factors

plants to prefer rural locations and the predisposition of independent owners to locate near their family and friends. Preferences of North Carolina companies locating large plants are quite similar to those of the state as a whole.

#### Business versus Quality of Life Location Factors

Table V-10 summarizes this discussion by comparing the importance of business factors relative to community quality of life factors for all firms and also for each state and for plant size in North Carolina.

In each instance business factors were relatively more important in making the final site selection. Differences among the states are nominal. Responses do vary by plant size, however, and reaffirm the hypothesis that firms tend to scrutinize more closely both business factors and community quality of life factors when locating large plants. On the other hand, the lower scores for small plants reflect the findings that managers often do not consider alternate sites for such plants and tend to locate them based on the location of the owners' home and family rather than for either the business factors or the community quality of life factors listed in the survey.

#### Site Location Choices at the Margin: North Carolina versus Competing States

Firms were given several opportunities to compare the state actually chosen for a facility with others in their experience. Tables V-11 to V-13 make these comparisons by examining the states where firms reported their next best site and other sites they considered were located. A good deal of information can be obtained by looking at the state, size and industry breakdowns.

The first observation is that a large portion of the firms did not consider any other site for their facility. (See Table V-11.) About 25

TABLE V-10

OVERALL IMPORTANCE OF LOCATIONAL FACTORS

Location of Industrial Facilities	Mean Rating <sup>a</sup>	
	Composite Business Factors	Composite Quality of Life Factors
All Facilities	3.95	2.81
Virginia Facilities	3.91	2.39
South Carolina Facilities	3.90	2.73
North Carolina Facilities	3.98	2.94
North Carolina Large Facilities (250+ employees)	4.30	3.22
North Carolina Medium- size Facilities (50-249 employees)	4.00	3.00
North Carolina Small Facilities (less than 50 employees)	3.67	2.62

<sup>a</sup>Mean score on a scale of 1 to 5 with 1 = unimportant; 5 = extremely important.



TABLE V-11  
ALTERNATIVE SITES CONSIDERED FOR FACILITIES, BY STATE

Location of Alternative Sites	Percent of Firms Reporting Next Best and Other Sites Considered									
	All Firms		North Carolina		South Carolina		Virginia		Other	Other
	Next Best	Other	Next Best	Other	Next Best	Other	Next Best	Other		
No Others Considered	25	--	26	--	26	--	24	--		
North Carolina	32	28	45	45	19	9	0	0		0
South Carolina	16	22	9	20	36	39	0	0		0
Virginia	9	13	3	8	0	0	50	43		
Georgia	0	7	0	0	4	9	0	14		
Alabama	0	6	0	6	0	0	0	0		0
Tennessee	3	0	5	0	0	0	0	0		0
Florida	0	0	0	0	0	9	0	0		0
Maryland	0	5	0	0	0	9	0	14		
Pennsylvania	0	0	0	0	0	0	8	0		0
Other States	15	19	12	21	15	25	18	29		
Number of Facilities	172	88	101	51	47	23	24	14		

percent of firms in each of the three states have no other site. Table V-12 shows that this percentage decreases markedly as the size of the establishment increases. Large North Carolina plants have only 15 percent in the "no other sites" class.

Perhaps a better indicator of the competition between states is the percent of firms that did not consider another state. Adding together the "no other considered" and the percent whose next best site was in the same state, we have a percent who were mainly considering one state. For North Carolina this is 71 percent, for South Carolina 62 percent, and for Virginia 74 percent. Not surprisingly, this factor was highest for small plants in North Carolina, where 81 percent had no other site or the next best site in the state. More out-of-state sites were considered for medium-sized plants, however, than for the largest plants, perhaps because their needs can be met by sites in more areas.

There is a strong orientation towards the Southeast in the responses. North and South Carolina are the most closely associated in the siting decision, and along with Virginia, Georgia and Tennessee form a group of states that received the most attention. Many other states were mentioned, but they were scattered around the country and did not amount to a large proportion of the total. So whereas most firms consider several sites, the majority have their chosen site and the next best site in one state, and most sites outside the chosen state are in the Southeast. This is in accord with the responses to the locational factors analysis reported above; proximity to markets, industrial climate and labor productivity are considered to be shared characteristics in the region.

There are some differences by industry in location preferences. (See Table V-13.) Textile firms are very tightly bunched in North Carolina,

TABLE V-12

ALTERNATIVE SITES CONSIDERED FOR NORTH CAROLINA FACILITIES,  
BY STATE AND SIZE OF PLANT

Location of Alternative Sites	Percent of Firms Reporting Next Best and Other Sites Considered					
	Large (250+ employees)		Medium (50-249 employees)		Small (Under 50 employees)	
	Next Best	Other	Next Best	Other	Next Best	Other
No Others Considered	15	15	23	23	38	38
North Carolina	56	41	33	40	43	57
South Carolina	9	18	13	27	5	14
Virginia	0	14	0	0	5	0
Georgia	6	0	0	0	0	0
Tennessee	6	0	10	0	0	0
Texas	0	0	0	0	0	7
Michigan	0	0	7	0	0	0
Pennsylvania	0	0	0	7	0	0
New York	0	0	0	0	0	7
Other States	8	27	14	26	9	15
Number of Facilities	34	22	30	15	37	14

TABLE V-13

## ALTERNATIVE SITES CONSIDERED FOR FACILITIES, BY INDUSTRY

Location of Alternative Sites	Percent of Firms Reporting Next Best and Other Sites Considered											
	Textiles			Chemicals			Metals			Machinery		
	Next	Best	Other	Next	Best	Other	Next	Best	Other	Next	Best	Other
No Others Considered	21	0	0	38	0	0	6	0	0	21	0	0
North Carolina	57	20	20	46	17	17	65	25	25	36	25	18
South Carolina	14	40	40	0	33	33	0	0	0	11	33	36
Virginia	7	40	40	8	0	0	0	0	0	0	0	0
Alabama	0	0	0	0	17	17	0	17	0	0	0	18
Georgia	0	0	0	0	0	0	0	0	0	7	0	0
Tennessee	0	0	0	0	0	0	0	0	0	7	0	0
Maryland	0	0	0	0	33	33	0	0	0	0	0	0
Pennsylvania	0	0	0	8	0	0	0	0	0	0	0	0
Other States	1	0	0	0	0	0	29	58	42	18	28	28
Number of Facilities	14	5	5	13	6	6	16	12	12	28	12	11



South Carolina and Virginia. Very few considered any state beside these three. Chemical firms, on the other hand, tend to look all over the Atlantic seaboard, with alternative sites being considered fairly frequently in Maryland and Pennsylvania. These companies are often headquartered in the Northeast and consider building near the home base as well as in the Southeast. Metals and machinery are also not confined to the Southeast in their search. They have supplier and customer ties in the Northeast and North Central region, so that the comparison of sites for them is more often between a Northern and a Southern state. Electronics is the most foot loose of the industry groups shown in Table V-13. It has the lowest combined percentage of no alternative sites and next best site in North Carolina. Yet North Carolina is attracting a sizable share of these facilities. It appears that electronic firms are searching for sites over a wider area than most other industries, but they are finding North Carolina to be an attractive location. This is in contrast with an industry such as textiles, which also favors North Carolina but only considers sites in this state and its immediate neighbors.

#### How Alternative Sites Compared

Given that firms are considering several states for locating a facility and that they are concerned with certain business and quality of life factors in choosing a site, the question remains whether the firm found the chosen site to be better than the next best site and on what criteria. Tables V-14 and V-15 look at this issue for two different state comparisons.

In Table V-14, officials of plants which decided on a site in South Carolina and which listed North Carolina as the next best site were asked which factors were perceived to be better at the site they chose. For the most part, the factors listed were those which respondents cited most often as important. Again, environmental business factors were not important. It is

TABLE V-14

SITE COMPARISONS BY FIRMS -  
SOUTH CAROLINA VERSUS NORTH CAROLINA

---

Factors Considered to Be Better at Chosen Site in South Carolina When  
Compared with Next Best Site Located in North Carolina<sup>a</sup>

---

Business Factors (in order)

State/Local Industrial Climate  
Land Availability/Room for Expansion  
Cost of Land and Construction  
Availability of Technical Training Programs  
Wage Rate  
Labor Productivity  
Unskilled Labor Supply

Community Quality of Life Factors (in order)

Recreational Opportunities  
Cost of Living  
Housing  
Cultural Resources  
Personal Taxes

---

<sup>a</sup>Nine facilities located in South Carolina listed a next best site located  
in North Carolina.

---

necessary to evaluate Table V-14 in conjunction with Table V-15, which shows the reverse comparison of the advantage of sites chosen in North Carolina over the next best one in South Carolina. In the area of business factors, the responses of the two groups of firms in a sense cancel themselves out. Cost of construction, land availability, wage rate, labor productivity and unskilled labor supply were all cited as better in South Carolina by South Carolina plants and as better in North Carolina by North Carolina plants. No doubt part of this contradiction reflects the unique needs of each company, although it is hard to make that argument for wage rates and unskilled labor. Also, they are comparing sites, not states, and the differences within

TABLE V-15

SITE COMPARISONS BY FIRMS -  
NORTH CAROLINA VERSUS SOUTH CAROLINA

---

Factors Considered to Be Better at Chosen Site in North Carolina When  
Compared with Next Best Site Located in South Carolina<sup>a</sup>

---

Business Factors (in order)

Wage Rate  
Unskilled Labor Supply  
Cost of Land and Construction  
Land Availability/Room for Expansion  
Labor Productivity  
Proximity to Markets

Community Quality of Life Factors (in order)

Aesthetic Quality of Natural Landscape (Scenery)  
Recreational Opportunities  
Personal Taxes  
Physical Quality of Air and Water Resources  
Cost of Living

---

<sup>a</sup>Nine facilities located in North Carolina listed a next best site located  
in South Carolina.

---

states among various sites could also cause this result. But, to a large degree these responses may reflect the attitudes of the decision makers as much as the reality of the situation.

The only factors which differ in this comparison of Tables V-14 and VI-15 are industrial climate, which was rated better in South Carolina, and proximity to markets, which was felt to be better in North Carolina. The quality of life factors were also overlapping to a large extent, although firms locating plants in North Carolina (but who considered a South Carolina site) liked the scenery better and firms locating plants in South Carolina (but who considered a North Carolina site) thought their housing situation was better.

These comparisons were intended to apply only to the chosen site versus the next best site, but it is possible that especially Northern-based firms were in reality indicating which factors were better in the region compared with the North rather than strictly between North and South Carolina.

#### States Considered Best for New Industrial Facilities

After evaluating their chosen site, managers were asked in an open-ended way to vote for the top three states in which to locate a new facility in their industry. They were also asked to list the location factors which would be most important in the decision. The results of this "beauty contest" are quite favorable to North Carolina (see Tables V-16 and V-17). North Carolina was ranked first over South Carolina more than in proportion to the number of facilities polled in the two states. North Carolina respondents preferred their state over the next most often named state, South Carolina, by a wider margin than South Carolina respondents preferred their state. A large number of Virginia firms also ranked North Carolina first, and none ranked South Carolina first. Finally, the big North Carolina facilities gave the largest share of their votes to the state for first place (75 percent).

Because this was a popularity vote rather than an actual site selection, a wide variety of states received mention. California, Texas and Florida were named more often in this question than in the question regarding the states which had been considered in the site decision. This may reflect the influence of national publicity dealing with the most popular states.

The top location factors mentioned correspond fairly closely to those which the respondents rated as important for their own site selection. Industrial climate and labor productivity were again the most often mentioned. Individual industries followed the same general pattern as in their site selection decisions. Textiles did not consider any states other than the



TABLE V-16

MOST PREFERRED STATES FOR LOCATING A NEW FACILITY AND  
MOST IMPORTANT FACTORS IN THE DECISION, BY STATE

Most Preferred States	Percent of Firms Listing State as:			Top Location Factors
	First Choice	Second Choice	Third Choice	
<u>All Firms Interviewed</u>				
North Carolina	45	20	5	1. Proximity to markets
South Carolina	19	22	16	2. Industrial climate
Virginia	7	0	10	3. Labor productivity
Georgia	0	9	14	4. Unskilled labor supply
Tennessee	0	0	7	5. Skilled labor supply
Texas	8	7	6	
Florida	0	7	0	
Other States	21	35	52	
Number of Firms	169	148	127	
<u>Firms with North Carolina Plants</u>				
North Carolina	66	10	0	1. Industrial climate
South Carolina	4	34	16	2. Proximity to markets
Virginia	3	9	11	3. Labor productivity
Tennessee	0	0	9	4. Unskilled labor supply
Georgia	4	10	10	5. Proximity to suppliers
Texas	9	9	8	
Other States	14	28	46	
Number of Firms	97	82	75	
<u>Firms with South Carolina Plants</u>				
North Carolina	14	39	0	1. Proximity to markets
South Carolina	53	9	13	2. Industrial climate
Georgia	0	9	26	3. Labor productivity
Florida	0	10	0	4. Skilled labor supply
California	0	0	11	5. Technical Training
Texas	8	0	0	
Colorado	6	0	0	
Other States	19	33	50	
Number of Firms	51	47	38	
<u>Firms with Virginia Plants</u>				
North Carolina	24	21	0	1. Proximity to markets
South Carolina	0	0	21	2. Transportation
Virginia	38	11	21	3. Proximity to suppliers
Pennsylvania	0	11	0	4. Industrial climate
Florida	0	11	0	5. Unskilled labor supply
Other States	38	46	58	
Number of Firms	21	19	14	

TABLE V-17

MOST PREFERRED STATES FOR LOCATING A NEW FACILITY AND MOST  
IMPORTANT FACTORS IN THE DECISION: NORTH CAROLINA  
FIRMS BY SIZE OF PLANT AND INDUSTRY GROUP

	Percent of Firms Listing State as:			
	First Choice	Second Choice	Third Choice	
Most Preferred States				Top Location Factors
<u>Large Firms</u> (250+ employees)				
North Carolina	75	9	0	1. Industrial climate
South Carolina	0	45	16	2. Labor productivity
Virginia	0	12	19	3. Unskilled labor supply
Alabama	0	0	10	4. Skilled labor supply
Tennessee	0	0	10	5. Proximity to markets
Texas	9	0	0	
Other States	16	34	45	
Number of Firms	35	33	31	
<u>Medium Firms</u> (50-249 employees)				
North Carolina	70	12	0	1. Proximity to markets
South Carolina	0	32	19	2. Unskilled labor supply
Virginia	0	8	0	3. Skilled labor supply
Georgia	4	0	14	4. State/local industrial climate
Tennessee	4	12	14	
Texas	11	12	0	5. Existing facility
Other States	11	24	53	
Number of Firms	27	25	21	
<u>Small Firms</u> (under 50 employees)				
North Carolina	54	8	9	1. Proximity to markets
South Carolina	9	21	13	2. State/local industrial climate
Georgia	6	21	9	
Tennessee	0	8	0	3. Business taxation
Texas	9	8	13	
Other States	22	34	56	
Number of Firms	35	24	23	
<u>Textile Firms</u>				
North Carolina	38	0	0	1. Industrial climate
South Carolina	31	0	0	2. Unskilled labor supply
Virginia	23	0	0	3. Business taxation
Other States	8	0	0	
Number of Firms	13	0	0	

TABLE V-17 (CONTINUED)

	Percent of Firms Listing State as:			
Most Preferred States	First Choice	Second Choice	Third Choice	Top Location Factors
<u>Chemical Firms</u>				
North Carolina	50	0	0	1. Proximity to markets
Other States	50	0	0	2. Unskilled labor supply
Number of Firms	14	0	0	3. Transportation
				4. Cost of land and construction
<u>Metals Firms</u>				
North Carolina	29	0	0	1. Proximity to markets
South Carolina	12	0	0	2. Wage rate
Texas	24	0	0	3. Land availability
Colorado	18	0	0	
Other States	17	0	0	
Number of Firms	17	0	0	
<u>Machinery Firms</u>				
North Carolina	39	0	0	1. Industrial climate
South Carolina	29	0	0	2. Labor productivity
Other States	32	0	0	3. Technical training
Number of Firms	28	0	0	4. Right-to-work law
				5. Proximity to markets
<u>Electronics Firms</u>				
North Carolina	47	25	0	1. Industrial climate
South Carolina	18	13	0	2. Skilled labor supply
Georgia	0	19	0	3. Labor productivity
Texas	12	13	0	4. Proximity to markets
California	12	0	0	
Other States	11	30	0	
Number of Firms	17	16	0	

three being studied. Chemicals, metals and machinery voted mainly for the Carolinas, with the rest of their votes being too scattered to give any one state a significant percentage. Electronics firms had the largest concentration of votes outside the region, in Texas and California, reflecting the footloose and national character of their location decisions.

On the other hand, some differences appear in the state popularity contest as a result of the nature of the question. Since firms were not looking at actual sites in voting for the best states, "land availability" and "cost of land" do not appear here, while they ranked fourth and fifth as actual site selection factors (Table V-3). Conversely, "proximity to markets" is a top factor in the popularity contest but ranks eleventh overall in site selection. This may be further evidence, as discussed in Section V, that the decision regarding a region is made before the site search is done. In this case, proximity to markets would have been decided already when site selection began.

While the popularity contest differs from the site choice responses in some ways, the major results of both of these approaches to state competition are the same. North Carolina comes in with a strong performance both overall and among facilities in the state. Nor is there any evidence of regret by those who made the decision to site here.





## VI. FIRMS' EXPERIENCE WITH THE ENVIRONMENTAL PERMITTING PROCESS

In the preceding section the importance of environmental considerations among a variety of industrial location factors was described. Most firms indicated that environmental regulations were moderately important in their choice of a site for a new plant. In this and the following section the analysis looks more closely at industrial firms' encounters with state environmental permitting processes. Section VI examines the number and types of permits obtained as well as the nature of the process utilized by the firms. The focus of the analysis is on the timing of firms' consideration of environmental regulations in the site selection process and who actually conducts the required technical analysis before an application is filed. Much interest has been focused on how the states of Virginia, North Carolina, and South Carolina compare with regard to the administration of environmental regulations. Firms locating new plants in these states were asked to compare the procedures in each state with those of other states with which they were familiar. These results are presented at the end of the section. Section VII then examines the impacts of permitting processes on site selection decisions and plant construction.

### Permits Obtained

The number and types of permits obtained by the firms locating new facilities in the region are tabulated in Table VI-1. In all three states the most frequently obtained permit is approval to connect to a municipal wastewater treatment plant. Overall, 70 percent of the firms had to obtain municipal approval. The next most frequently obtained permits were air

TABLE VI-1

ENVIRONMENTAL PERMITS OBTAINED FOR INDUSTRIAL  
FACILITIES LOCATING IN NORTH CAROLINA, SOUTH  
CAROLINA AND VIRGINIA, 1977 - 1981

Type of Permit Obtained	Percent of Industrial Facilities <sup>a</sup>			
	All Firms	North Carolina	South Carolina	Virginia
<u>Air Quality</u>				
State air quality permit	38	37	29	63
PSD (Prevention of Significant Deterioration) permit	6	6	9	4
<u>Water Quality</u>				
State water quality permit	7	6	9	8
NPDES (National Pollution Discharge Elimination System) permit	22	19	20	33
Septic tank	12	14	14	0
Municipal sewer hook-up	70	69	62	87
<u>Solid and Hazardous Waste</u>				
Solid waste permit	17	19	20	4
Hazardous waste permit	21	23	23	8
<u>Dredge and Fill</u>				
Dredge and fill permit	4	7	0	0
Number of Facilities	159	90	45	24

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does NOT include plant expansions.

quality (38 percent), NPDES water quality permits (22 percent), and hazardous waste permits (21 percent). The frequency with which permits were obtained is very similar for North and South Carolina. A higher percentage of firms locating in Virginia obtained air quality and NPDES permits, but a lower percentage obtained hazardous waste permits.

#### Size of Facility

In general, as facility size increases, the number of permits obtained and the percentage of firms obtaining any given permit increases. See Table VI-2. For example, the percentage of firms obtaining NPDES permits increased from 8 percent for small facilities (under 50 employees) to 46 percent of large facilities (250 or more employees), the most sensitive change due to facility size. The one exception is septic tank approvals which exclusively involved small facilities. Of these facilities, 26 percent obtained septic tank approvals.

It is noteworthy that 100 percent of the large facilities, 24 establishments, connected to a municipal wastewater treatment plant. This figure underscores the importance of municipal wastewater treatment plant capacity for large firms choosing a new site.

It also should be noted that small facilities have little contact with environmental regulatory programs. The two exceptions are in the traditional areas of septic tank permits and municipal wastewater treatment plant connections.

#### Type of Firm

Table VI-3 breaks out the number of permits obtained by type of firm. Because environmental standards vary by process type, capacity of process, and occasionally by process feedstock, major differences are not



TABLE VI-2

ENVIRONMENTAL PERMITS OBTAINED FOR INDUSTRIAL  
FACILITIES LOCATING IN NORTH CAROLINA  
BY SIZE OF FIRM

Type & Total Number of Permits Obtained	Percent of Industrial Facilities <sup>a</sup>			
	All Firms	Small (under 50 employees)	Medium (50 to 249 employees)	Large (250 or more employees)
<u>Air Quality</u>				
State air quality permit	37	16	43	63
PSD (Prevention of Significant Deterioration) permit	6	3	4	13
<u>Water Quality</u>				
State water quality permit	6	0	11	9
NPDES (National Pollution Discharge Elimination System) permit	19	8	11	46
Septic tank permit	14	26	0	0
Municipal sewer hook-up	69	46	75	100
<u>Solid &amp; Hazardous Waste</u>				
Solid waste permit	19	8	21	33
Hazardous waste permit	23	16	18	42
<u>Dredge &amp; Fill</u>				
Dredge and fill permit	7	5	7	8
<u>Total Number of Permits</u>				
None	12	25	0	0
One	49	50	69	25
Two to three	22	17	16	42
Four to six	17	8	15	33
Number of facilities	90	38	28	24

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does NOT include plant expansions.

TABLE VI-3  
ENVIRONMENTAL PERMITS OBTAINED FOR INDUSTRIAL FACILITIES  
LOCATING IN NORTH CAROLINA BY TYPE OF FIRM<sup>a</sup>

Type of Permit Obtained	Percent of Industrial Facilities (SIC code)											
	All Firms	Food (20)	Textiles (22)	Apparel (23)	Lumber (24)	Furniture (25)	Chemicals (28)	Rubber & Plastic (30)	Fabricated Metals (34)	Nonelectrical Machinery (35)	Electrical Machinery (36)	Transportation Equipment (37)
Air Quality												
State air quality permit	37	75	44	17	25	40	50	67	38	33	15	75
PSD (Prevention of Significant Deterioration) permit	6	25	0	0	0	0	17	0	0	7	8	0
Water Quality												
State water quality permit	6	0	0	0	0	0	33	33	0	0	0	25
NPDES (National Pollution Discharge Elimination System) Permit	19	100	33	0	0	20	17	33	25	20	8	13
Septic tank permit	14	0	33	0	33	0	25	0	0	43	0	17
Solid and Hazardous Waste												
Solid waste permit	19	50	22	17	0	40	33	33	38	20	0	13
Hazardous waste permit	23	0	22	17	0	40	33	33	25	33	15	25
Dredge and Fill												
Dredge and fill permit	7	25	0	0	25	20	0	0	13	0	0	13
Municipal Hook-ups												
Water (and sewer)	69	67	75	100	67	33	67	50	100	57	86	50
Total Number of Permits												
None	12	0	0	0	0	67	0	100	60	0	14	0
One	49	50	50	75	67	0	50	0	0	60	57	33
Two to three	22	50	50	0	33	0	25	0	0	20	14	67
Four to six	17	0	0	25	0	33	25	0	40	20	15	0
Number of Facilities	90	4	9	6	4	5	6	3	8	15	13	8
Percent of Facilities	100	4	10	7	4	6	7	3	9	17	14	9
aIncludes new plants, branch plants, relocated plants. Does NOT include plant expansions.												

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does NOT include plant expansions.

expected at the two-digit standard industrial classifications level. Hence, the permits issued are scattered among the industrial classifications listed with only a few areas of concentration. Foods, textiles, chemicals, rubber and plastics, and transportation equipment have a high rate of interaction with air quality permits. Food also has a high interaction rate with water quality permits and solid waste permits. In fact, 100 percent of the food industry establishments obtained NPDES permits. The firms having the least amount of interaction with municipal waste treatment plant connections are in the furniture industry.

When Environmental Regulations Are Considered  
in the Site Selection Process

The timing of environmental regulatory considerations can be a factor in determining how well the review process works. Table VI-4 shows when in the site selection process firms begin their consideration of environmental requirements. North Carolina has the highest percentage of facilities in which environmental concerns were incorporated into site selection from the beginning of the planning process. For all three states, in over 60 percent of the facility location decisions environmental considerations were entered into the decision process before or during the site selection process. This means that most firms allow ample time for environmental regulation to be considered when locating a site for a new plant. It also means that disruptions in plant construction schedules and facility design could have been minimized by incorporating environmental requirements into the design process.

The timing of firms' consideration of environmental regulations in the site selection process varied depending on the type of permit obtained. For example, Table VI-5 shows that of the North Carolina industrial facilities

TABLE VI-4  
WHEN FIRMS FIRST BEGAN TO CONSIDER STATE  
ENVIRONMENTAL REGULATIONS

Timing	Percent of Industrial Facilities <sup>a</sup>			
	All Firms	North Carolina	South Carolina	Virginia
When Planning for New Facility Began	53	63	48	50
During Site Selection Process	16	14	24	13
After Site Selection	31	23	28	37
Total	100	100	100	100
Number of Facilities <sup>b</sup>	110	65	29	16

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does NOT include plant expansions.

<sup>b</sup>Data were not available for 49 firms.

obtaining state air quality permits, 79 percent involved consideration of environmental requirements at the beginning of the planning process. In general, firms that had to obtain a major environmental permit considered environmental factors earlier in the planning process than firms on average. This may be due to two factors. First, firms realize that the major permits usually require more analysis before filing an application and more review time on the part of the state agencies. Second, the results may be attributed to the fact that major permits were more often obtained for large plants which tend to involve more comprehensive approaches to site selection than smaller plants.



TABLE VI-5

TIMING OF NORTH CAROLINA FIRMS' CONSIDERATION OF  
STATE ENVIRONMENTAL REGULATIONS BY TYPES OF PERMITS OBTAINED

Type of Permit Obtained	Percent of Facilities First Considering Environmental Regulation <sup>a</sup>			Total
	When Planning for New Facil- ities Began	During Site Selection	After Site Selection	
All Facilities	63	14	23	100
State air quality permit	79	12	9	100
NPDES (National Pollution Discharge Elimination System) permit	89	0	11	100
Hazardous waste permit	78	13	9	100
Municipal Hook-up	72	14	16	100

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does NOT include plant expansions.

In any event, as can be seen from Table VII-6, environmental requirements were considered at the beginning of the planning process more often for large industrial plants than for small- or medium-size plants. In addition, only four percent of the large plants involved consideration of environmental requirements after the site had been selected. In contrast, environmental factors were first considered after a site had been selected in 38 percent of the small plant location decisions. Thus, large plants require more permits with more complicated analysis, but firms tend to allow more time to accommodate these requirements.

TABLE VI-6

TIMING OF NORTH CAROLINA FIRMS' CONSIDERATION  
OF STATE ENVIRONMENTAL REGULATIONS BY SIZE  
OF FACILITY

Size of Facility	Percent of Facilities First Considering Environmental Regulations <sup>a</sup>		
	When Planning for New Facili- ties Began	During Site Selection	After Site Selection
Small (under 50 employees)	54	8	38
Medium (50 - 249 employees)	56	17	27
Large (250 or more employees)	78	18	4

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does NOT include plant expansions.

The importance of when firms begin to consider environmental factors is stressed by both industry and state officials. The earlier a firm knows about environmental regulations and begins to prepare to comply with them, the less likely are the chances for difficulties in obtaining a permit. It appears from these results that when large industrial facilities are being sited, firms understand this and structure their review process accordingly. There are, however, a fairly large percentage of decisions involving small- and medium-size plants in which environmental regulations are not considered until after firms have selected a specific site. Perhaps this is so because experience has shown that environmental regulations do not affect these small plants very much. The data shown in Table VI-2 tend to support this explanation as do the results discussed in Section VII below.

The timing of the environmental considerations in plant location and development decisions varies by type of industry. This is probably a function

of factors already discussed. That is, the size of the typical establishment and whether or not firms must obtain one of the major permits. Furniture and electrical machinery had the highest percentage of facilities in which environmental requirements were not considered until after site selection. Food, textile, non-electrical machinery, and transportation equipment tended to have the highest percentage of plants in which environmental requirements were incorporated into the initial planning stages of site selection.

#### Participants in Environmental Analyses Required for Permits

Applications for most environmental permits require technical analyses of pollutants generated, control technology, and impacts on the environment. Industrial firms have a variety of options when considering how to have these technical analyses done. They may use in-house staff or, alternatively, may utilize the services of outside consultants. State industrial development and environmental management agencies also provide assistance. These different service options are not mutually exclusive and are usually utilized in conjunction with one another.

The key participants in the review process do not vary greatly from one state to another. See Table VI-7. South Carolina firms indicate a high degree of use of consultants and state agency personnel and a correspondingly lower use of in-house staff, although the differences are small. The Virginia firms made the least use of the state's industrial development agency, which concentrated its attention on nonmanufacturing economic activities. In general, firms utilize their own personnel with support obtained from outside agents in 20 to 30 percent of the cases. Often support is obtained from more than one outside group.

TABLE VI-7

KEY PARTICIPANTS IN ENVIRONMENTAL ANALYSES  
CONDUCTED FOR STATE ENVIRONMENTAL PERMITS

Participants	Percent of Industrial Facilities <sup>a</sup>			
	All Firms	North Carolina	South Carolina	Virginia
<u>In-house staff</u>	67	72	50	70
<u>Consultants</u>				
Environmental	25	24	35	15
Industrial siting	8	8	7	10
Process design	8	9	11	5
<u>State staff</u>				
Industrial development	16	16	21	5
Environmental management	28	25	37	25
Number of facilities <sup>b</sup>	122	72	30	20

<sup>a</sup>Includes analyses performed for new plants, branch plants, relocated plants. Does NOT include plant expansions.

<sup>b</sup>Data were not available for 37 facilities.

Regardless of plant size, a mixture of in-house, consulting, and state personnel tend to be used in conducting the analyses required for environmental permits. The larger a plant was, however, the more likely it was to have involved state environmental management agency personnel in the analysis process. For North Carolina firms, the rate of use of the state's environmental management agencies increased from 11 percent to 47 percent as plant size changed from small (under 50 employees) to large (250 or more employees). See Table VI-8. This may be because of the complex analysis required of large pollution sources. Such analyses involve specialized



TABLE VI-8

KEY PARTICIPANTS IN NORTH CAROLINA FIRMS'  
ENVIRONMENTAL ANALYSES BY SIZE OF FACILITY

Size of Facility	Percent of Industrial Facilities <sup>a</sup>					
	In-house staff	Consultants			State Staff	
		Environ- mental	Industrial Siting	Process Design	Industrial Development	Environmental Management
Small (under 50 employees)	68	15	7	7	7	11
Medium (50 - 249 employees)	64	24	10	10	19	24
Large (250 or more employees)	86	37	6	11	26	47

<sup>a</sup>Includes analyses performed for new plants, branch plants, relocated plants. Does NOT include plant expansions.

data which often must be provided by state agencies, and the environmental assessment is often a joint effort involving analytical work on the part of industry and state personnel.

Table VI-9 also illustrates the fact that if a North Carolina firm is involved in obtaining one of the major permits, it has a higher rate of use of both consultants and state agency personnel than do firms in general. Recall that the permits listed in Table VI-9 are more frequently obtained by large firms. Thus it appears that as the complexity of the analytical work required increases so do the number and specialization of the participants in the analytic process. It happens that this is mainly true for large plants, for despite the fact that they are more likely to involve firms with specialized staff, they also are the firms involved in the more complex environmental reviews and hence utilize outside assistance frequently.

TABLE VI-9

KEY PARTICIPANTS IN NORTH CAROLINA FIRMS'  
ENVIRONMENTAL ANALYSES BY TYPE OF PERMIT OBTAINED

Type of Permits Obtained	Percent of Industrial Facilities <sup>a</sup>					
	In-house staff	Consultants			State Staff	
		Environ- mental	Industrial Siting	Process Design	Industrial Development	Environmental Management
All Facilities	72	24	8	9	16	25
State air quality permit	92	32	7	16	29	34
NPDES (National Pollution Discharge Elimination System) permit	84	56	14	25	31	50
Hazardous waste permit	91	38	10	15	20	29
Municipal hook-up	68	34	9	17	28	33

<sup>a</sup>Includes analyses performed for new plants, branch plants, relocated plants. Does NOT include plant expansions.

Firms' Evaluation of the Permitting Process

Firms which had experience with state environmental agencies were asked to evaluate the administrative procedures of the state in which they located. Each firm was asked to compare the procedures in their state with those of other states with which they were familiar. The procedural issues were divided into four categories: time required to review a permit application; ease of analysis; the availability of data to carry out that analysis; and enforcement.

Concern has focused on the time required to review a permit in North Carolina, especially when compared with neighboring states. However, responses of firms with plants in North Carolina, South Carolina, and Virginia were very similar. Most firms felt that the review time of the state they located a facility in was better than or about the same as other states.

As can be seen in Table VI-10, North Carolina firms rated the review time required by North Carolina as better than other states more frequently than firms locating in the state of South Carolina. On the other hand, the complexity of analysis and data availability were rated better than other states less frequently in North Carolina than in South Carolina and Virginia. The differences, however, are slight, and the dominant opinion shows that the states received very similar ratings for these indicators.

The opinion of firms diverged somewhat with regard to enforcement policy. Virginia received a higher percentage of "better than" ratings than either North Carolina or South Carolina. In each state, however, firms tended to rate the reasonableness of their state's enforcement policy more highly than other aspects of the permitting process. North Carolina was rated better than or the same as other states by 92 percent of the North Carolina firms interviewed, although it received less "better than" ratings than South Carolina or Virginia.

The North Carolina firms were examined in more detail to determine if their opinions varied according to the type of permits obtained or size of plant. Firms obtaining one of the major permits (air quality, NPDES, hazardous waste) were more likely to rate North Carolina better than other states with which they were familiar. (See Table VI-11.) For North Carolina firms obtaining an air quality permit, 44 percent rated North Carolina better than other states in time required to review permit application compared to 39 percent for all firms. While this is a small difference, it is noteworthy because it is the air quality permit review process, especially PSD reviews, that is often cited as the cause of excessive delay. These results indicate that if there was a review time problem it was not significantly different in other states. (Recall that during the period of this survey, all

TABLE VI-10

FIRMS' EVALUATION OF STATE ENVIRONMENTAL REGULATIONS IN  
COMPARISON WITH OTHER STATES WITH WHICH MANAGEMENT WAS FAMILIAR

Indicator	Percent of Firms <sup>a</sup>			
	All Firms	North Carolina	South Carolina	Virginia
<u>Time Required to Review and Issue Permit in Comparison with Other States</u>				
Better	38	39	26	50
Same	54	54	58	50
Worse	8	7	16	0
Number of firms	72	41	19	12
<u>Availability of Data in Comparison with Other States</u>				
Better	21	18	28	17
Same	72	71	66	83
Worse	7	11	6	0
Number of firms	68	38	18	12
<u>Ease of Analysis Required in Comparison with Other States</u>				
Better	29	25	33	50
Same	65	67	61	50
Worse	6	8	6	0
Number of firms	69	40	18	11
<u>Reasonableness of Enforcement Policy in Comparison with Other States</u>				
Better	48	40	50	73
Same	46	52	44	27
Worse	6	8	6	0
Number of firms	69	40	18	11

<sup>a</sup>Includes firms siting new plants, branch plants, relocated plants. Does NOT include expansions at the same site.



TABLE VI-11  
NORTH CAROLINA FIRMS' EVALUATION OF STATE  
ENVIRONMENTAL REGULATIONS BY TYPE OF PERMIT OBTAINED

Indicator	Percent of Firms by Permit Obtained <sup>a</sup>			
	All Firms	Air Quality Permit	NPDES (Water Quality) Permit	Hazardous Waste Permit
<u>Time Required to Review &amp; Issue Permit in Comparison with Other States</u>				
Better	39	44	40	41
Same	54	44	53	47
Worse	7	12	7	12
Number of firms	41	25	15	17
<u>Availability of Data in Comparison with Other States</u>				
Better	18	21	36	29
Same	71	70	64	59
Worse	11	9	0	12
Number of firms	38	24	14	17
<u>Ease of Analysis Required in Comparison with Other States</u>				
Better	25	32	40	41
Same	67	60	60	47
Worse	8	8	0	12
Number of firms	40	25	15	17
<u>Reasonableness of Enforcement Policy in Comparison with Other States</u>				
Better	40	44	47	41
Same	52	48	53	47
Worse	8	8	0	12
Number of firms	40	25	15	17

<sup>a</sup>Includes firms siting new plants, branch plants, relocated plants. Does NOT include expansions at the same site.

of the states went through a period of confusion and much interaction with EPA on PSD permit reviews).

Firms obtaining NPDES permits were most likely to rate various aspects of North Carolina's permitting process as better than those of other states. The proportion of firms rating the availability of data better than other states increased from 18 percent on average to 36 percent, and the ease of analysis rating went from 25 percent to 40 percent. Ease of analysis was also rated somewhat better than average for firms obtaining a hazardous waste permit.

Table VI-12 shows the effect of plant size on the ratings. In general, firms' evaluations of the environmental permitting process do not change much as plant size changes. There is one major exception, however. Sixty-three percent of the small firms rated enforcement policy in North Carolina as "better than" other states, whereas only 27 percent of large firms rated the state better. But, for all categories, no large firm rated North Carolina worse than other states.

In summary, firms tended to rate the environmental permitting process of the state they located in as the same as or better than other states with which they had had experience. There are no major differences among the three states in any of the four aspects of the regulatory process which were examined. As noted in Appendix B, for the most part North Carolina, North Carolina and Virginia follow similar procedures in implementing various environmental regulations. Thus, the lack of difference noted by industrial firms should not be surprising. Where differences do occur, they are small enough not to influence the location decision of firms. This and other potential impacts of environmental regulations are examined in the following section.

TABLE VI-12

NORTH CAROLINA FIRMS' EVALUATION OF STATE  
ENVIRONMENTAL REGULATIONS BY SIZE OF PLANT

Indicator	Percent of Firms by Size of Plant <sup>a</sup>			
	All Firms	Small (under 50 employees)	Medium (50-250 employees)	Large (250 or more employees)
<u>Time Required to Review &amp; Issue Permit in Comparison with Other States</u>				
Better	39	36	50	33
Same	54	57	33	67
Worse	7	7	17	0
Number of firms	41	14	12	15
<u>Availability of Data in Comparison with Other States</u>				
Better	18	25	17	14
Same	71	67	58	86
Worse	11	8	25	0
Number of firms	38	12	12	14
<u>Ease of Analysis Required in Comparison with Other States</u>				
Better	25	23	25	27
Same	67	69	58	73
Worse	8	8	17	0
Number of firms	40	13	12	15
<u>Reasonable of Enforcement Policy in Comparison with Other States</u>				
Better	40	62	33	27
Same	52	30	50	73
Worse	8	8	17	0
Number of firms	40	13	12	15

<sup>a</sup>Includes firms siting new plants, branch plants, relocated plants. Does NOT include expansions at the same site.

## VII. IMPACTS OF ENVIRONMENTAL REGULATIONS ON INDUSTRIAL SITE SELECTION AND DEVELOPMENT

State environmental regulations may affect firms' choice of sites and the design of particular plants. Both impacts are examined in this section. In the case of site selection, the analysis centers on (1) the extent to which firms have avoided sites because they could not meet environmental standards and (2) the extent to which cost and procedural factors (delays, data availability, ease of analysis, enforcement policies) have played a role in industrial site selection decisions. In the case of plant design and development impacts, the analysis focuses on the extent to which firms have had to change plant designs or have experienced construction delays as a result of state environmental regulations. As in earlier sections of this report, the analysis includes comparisons among states--North Carolina, South Carolina, and Virginia--and, within North Carolina, among firms obtaining different types of permits, firms siting small, medium, and large facilities, and firms representing different industries.

Before turning to the results of these analyses, it is important to reiterate a key finding noted earlier in Section V. That is, environmental regulations tend to be of only moderate importance in most firms' plant location decisions. Among nineteen business factors firms are likely to consider in siting an industrial facility, state environmental regulations were ranked thirteenth in overall importance by management personnel. Only two industrial groups ranked environmental regulations among the top ten factors they considered in siting a new plant--chemical firms, which ranked environmental regulations fourth, and textile firms, which ranked them ninth. Only two firms, one in North Carolina and one in New Jersey, did not build on a preferred site because an environmental permit was denied or would have taken too



long to obtain. The North Carolina firm found another site within the state, while the New Jersey firm eventually selected a site in Virginia. Thus, environmental regulations come into play only at the margins of industrial firms' site selection decision processes, after a number of more critical factors have been examined and evaluated.

### Site Selection Impacts

Environmental regulations may affect industrial site selection decisions in three principal ways. First, the substantive requirements of particular regulations may be difficult or impossible for some firms to meet at particular locations. For example, water quality standards may prevent firms producing certain effluents from discharging wastes into particular rivers, streams, or lakes, forcing the firms to look for sites where less control is required. Second, in some cases firms may be able to meet state standards, but only if they include costly pollution control equipment in plant design. Depending upon other attributes of the site, firms may be more or less willing to incur these costs. Third, the way particular regulations are administered may affect firms' consideration of particular sites. For example, if a regulation is overly complex or if obtaining a required permit would entail a considerable length of time, firms may avoid a site which would involve them with the particularly complex or time consuming regulation. Each of these potential impacts is considered next.

### Water and Air Quality Standards

Very few firms in North Carolina, South Carolina, or Virginia--under 10 percent of the industrial facilities locating in each state--reported avoiding a potential site because of water or air quality conditions. See Table VII-1. Among industrial facilities locating in North Carolina, only 4 percent avoided

TABLE VII-1

IMPACTS OF ENVIRONMENTAL REGULATIONS ON SITE SELECTION:  
SITES AVOIDED DUE TO REGULATION

Impact	Percent of Facilities <sup>a</sup>			
	All Firms	North Carolina	South Carolina	Virginia
<u>No Sites Avoided Due to Environmental Regulations</u>	94	96	92	85
<u>Site Avoided Due to:</u>				
1. Assimilative capacity of stream or river too low to accept discharge of wastewater	5	4	5	10
2. Existing air pollution level would have required installation of extra controls	1	0	3	5
Number of facilities <sup>b</sup>	146	84	41	21

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does not include plant expansions.

<sup>b</sup>Data were not available for 13 facilities.

another site because the assimilative capacity of a stream or river was too low to accept potential plant wastewater discharges. No North Carolina firms avoided a site because existing air pollution levels would have required the installation of extra pollution control equipment. Firms whose site selection decisions were affected by water quality considerations were concentrated in three industries, food, textiles, and lumber, but in each case one in four or fewer new facilities were affected. Overall, only one in ten of the new North Carolina plants requiring NPDES (National Pollution Discharge Elimination

System) permits reported avoiding a site because of water quality conditions.

### Cost and Procedural Considerations

For most firms--over 90 percent of the new industrial facilities locating in North Carolina, South Carolina, and Virginia--the cost of complying with environmental regulations was not a factor considered in selecting a plant site. Procedural factors were somewhat more likely to have been considered, but even so involved only 14 percent of the new industrial facilities locating in the three states. As shown in Table VII-2, differences among North Carolina, South Carolina, and Virginia are slight.

TABLE VII-2

#### IMPACTS OF ENVIRONMENTAL REGULATIONS ON SITE SELECTION: ROLE OF COST AND PROCEDURAL FACTORS

Factors Influencing Final Site Selection Decision	Percent of Industrial Facilities <sup>a</sup>			
	All Firms	North Carolina	South Carolina	Virginia
<u>Cost of Complying with Environmental Regulations</u>				
A factor	8	8	10	5
Not a factor	92	92	90	95
Total	100	100	100	100
Number of facilities	146	86	39	21
<u>Procedures (review time, data availability, ease of analysis, enforcement policy) Associated with Environmental Regulations</u>				
A factor	14	13	14	21
Not a factor	86	87	86	79
Total	100	100	100	100
Number of facilities	127	71	37	19

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does not include plant expansions.

The likelihood of North Carolina firms considering cost and procedural factors in the site selection process varied, depending upon the types of permits required for a new facility. In the case of industrial facilities requiring NPDES and hazardous waste permits, both cost and procedural factors were much more likely than average to be a consideration in site selection. See Table VII-3. Although cost factors were usually not considered by firms locating plants requiring air quality permits, these firms were more likely than average to be concerned about procedural factors, such as data availability, complexity of the analyses required for permits and the review time before a permit was issued.

TABLE VII-3

IMPACTS OF ENVIRONMENTAL REGULATIONS ON SITE SELECTION  
OF FIRMS LOCATING IN NORTH CAROLINA: ROLE OF COST AND PROCEDURAL  
FACTORS BY TYPES OF PERMITS OBTAINED

Permit Obtained	Percent of Firms in Which Cost or Procedural Factors Influenced Final Site Selection Decision <sup>a</sup>	
	Cost of Compliance was a Factor	Procedure was a Factor <sup>b</sup>
All Facilities	8	13
Air Quality Permit	14	32
NPDES (National Pollution Discharge Elimination System) Permit	32	39
Hazardous Waste Permit	21	33

<sup>a</sup>Includes new plants, branch plants, relocated plants, does not include plant expansions.

<sup>b</sup>Procedural factors include review time, data availability, ease of analysis, and enforcement policy.



North Carolina firms' consideration of cost and procedural factors also varied by the size of the facility being located and the type of industry involved. As noted in the preceding section, larger facilities were much more likely to be required to obtain various state environmental permits than were medium- and small-size industrial facilities. As shown in Table VII were also much more likely to consider cost and procedural factors associated with these regulations in their site selection decisions. Reflecting their limited contact with environmental permitting procedures (for example, refer back to Table VI-2), small firms (under 50 employees) were virtually unconcerned with the cost and procedural implications of environmental regulations when they chose a site. Medium-size (50-249 employees) facilities were less likely to have required either an NPDES or hazardous waste permit than larger facilities, and, reflecting this fact, the costs of environmental regulations were less likely to have played a part in site selection decisions for them.

Food processing and textile plants, which were among those most likely to have been required to obtain an NPDES permit, were also among those in which the cost of compliance was most likely to have been considered in plant siting decisions. Cost was also a factor for the one apparel plant which required a hazardous waste permit, but for most firms in most industries the cost of complying with environmental regulations was not considered in siting new plants. On the other hand, as Table VII-4 illustrates, for trial firms in a number of different industries, procedural factors were considered.

In summary, neither cost nor procedural factors associated with environmental regulations are considered when most firms locate new industrial facilities. Cost considerations do begin to play a role, however, when firms are required to obtain NPDES and hazardous waste permits. Concern for procedural

TABLE VII-4

IMPACTS OF ENVIRONMENTAL REGULATIONS ON SITE SELECTION OF  
FIRMS LOCATING IN NORTH CAROLINA: ROLE OF COST AND  
PROCEDURAL FACTORS BY SIZE OF FACILITY AND TYPE OF FIRM

Type of Facility (SIC Code)	Percent of Firms in Which Cost or Procedural Factors Influenced Final Site Selection Decision <sup>a</sup>	
	Cost of Compliance was a Factor	Procedure was a Factor <sup>b</sup>
<u>All Facilities</u>	8	13
<u>Size of Facility</u>		
Small (under 50 employees)	0	3
Medium (50-249 employees)	7	19
Large (250 or more employees)	22	20
<u>Type of Facility</u>		
Food (20)	25	25
Textiles (22)	33	22
Apparel (23)	17	20
Lumber (29)	0	25
Furniture (25)	0	0
Chemicals (28)	0	25
Rubber/Plastic (30)	0	50
Fabricated Metals (34)	0	17
Nonelectrical Machinery (35)	7	0
Electrical Machinery (36)	8	0
Transportation Equipment (37)	0	20

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does not include plant expansions.

<sup>b</sup>Procedural factors include review time, data availability, ease of analysis, enforcement policy.

difficulties also increases when these permits, and also air quality permits, are required. The role of these factors in siting decisions does not seem to be associated with the type of industry involved, except that some industries are more likely to be involved with plants requiring NPDES and hazardous waste permits. The salience of cost and procedural difficulties associated with state environmental regulations increases with the size of the facility being located. However, in none of the 150-plus plant location decisions studied was a potential North Carolina industrial facility lost to another state because of North Carolina's environmental regulations.

#### Plant Design and Construction Impacts

Two potential design and construction impacts of environmental regulations are sometimes viewed with concern: costly facility design changes required to comply with regulations and plant construction delays. As shown in Table VII-5, North Carolina compares favorably with South Carolina and Virginia on both counts. Only 10 percent of the industrial facilities locating in North Carolina, versus 20 percent and 19 percent of those locating in South Carolina and Virginia, involved a plant design change attributable to an environmental regulation. Only 5 percent of the industrial facilities locating in North Carolina, versus 8 percent and 21 percent of those locating in South Carolina and Virginia, experienced construction delays as a result of state environmental regulations.

The firms which reported that they changed the design of a plant as a result of environmental regulations were asked which regulations caused the change. Hazardous and solid waste standards were mentioned most often, followed by NPDES regulations, requirements associated with municipal sewer hook-ups and those associated with obtaining air quality and PSD permits. Among plants locating in North Carolina, Table VIII-6 shows that firms in the

TABLE VII-5

IMPACTS OF ENVIRONMENTAL REGULATION ON  
PLANT DESIGN AND CONSTRUCTION

Impact	Total	Percent of Facilities <sup>a</sup>		
		North Carolina	South Carolina	Virginia
<u>Facility Design Changed As a Result of Environmental Regulation</u>				
Yes	14	10	20	19
No	86	90	80	81
Total	100	100	100	100
Number of Facilities	149	87	41	21
<u>Construction Schedule Delayed as a Result of Environmental Regulations</u>				
Yes	8	5	8	21
No	92	95	92	79
Total	100	100	100	100
Number of Facilities	142	83	40	19

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does not include plant expansions.

food, furniture and chemical industries were somewhat more likely than average to have changed plant design because of environmental regulations.

The construction delays reported were all delays of six months or less. Most delays reported were associated with air quality (including PSD) permits and NPDES permits. In North Carolina, delays were concentrated in three industries: food (25 percent of the new facilities locating in the state reported construction delays); chemicals (17 percent reported delays); and textiles (11 percent reported delays). No delays were reported by firms in other industries, and overall 95 percent of the North Carolina industrial facility location decisions studied did not involve construction delays.



TABLE VII-6

IMPACTS OF ENVIRONMENTAL REGULATIONS ON NORTH CAROLINA  
PLANT DESIGN AND CONSTRUCTION: BY SIZE OF  
FACILITY AND TYPE OF FIRM

Size and Type of Facility	Percent of Facilities in Which Environmental Regulation Result	
	Design Change	Delay in Construction Schedule
<u>All Facilities</u>	10	5
<u>Size of Facility</u>		
Under 50 employees	16	6
50-249 employees	0	0
250 or more employees	13	9
<u>Type of Firm (SIC code)</u>		
Food (20)	50	25
Textiles (22)	11	11
Apparel (23)	0	0
Lumber (24)	0	0
Furniture (25)	20	0
Chemicals (28)	17	17
Rubber/Plastic (30)	0	0
Fabricated Metals (34)	0	0
Nonelectrical Machinery (35)	7	0
Electrical Machinery (36)	8	0
Transportation Equipment (37)	14	0

<sup>a</sup>Includes new plants, branch plants, relocated plants. Does not include plant expansions.

## VIII. RECOMMENDATIONS FROM THE PRIVATE SECTOR

The last item in the survey interview schedule asked: "Do you have any recommendations for improving the environmental regulatory process? (such as changes in regulations or additions of incentives)."

Interestingly, over three quarters of the respondents made no response to this question. Generally this was because the firm either had little exposure to the environmental permitting process or else the firm's permits had been processed in a relatively routine manner. Seventy-five percent of the firms which did choose to respond to the question were considered in six industries (in rank order): machinery, electrical equipment, chemicals, furniture, textiles, and food. This distribution reflects both the industrial mix in the South Atlantic region as well as the fact that these industries are more affected by environmental regulations than others.

Although the question was open-ended, the nature of the responses tended to cluster around a number of major themes as presented in Table VIII-1. Note that the responses are not necessarily consistent or complementary.

The most frequent response was a general plea for the regulators to improve the quality of information disseminated to the industries. Most of the industries surveyed were genuinely interested in complying with both the spirit and the letter of the environmental regulations but were at times frustrated with the vagaries of the rules. If the environmental rules could be spelled out "crisply" at the beginning of a firm's planning process, industry would know what was expected of it, and expensive delays could be avoided. This situation is particularly difficult in areas of new legislation, such as hazardous wastes at present, where neither the federal government nor the states have determined the best way to proceed.

TABLE VIII-1

SUMMARY OF RECOMMENDATIONS AND COMMENTS  
FROM INDUSTRY TO REGULATORS

Recommendations/Comments	Percent of Comments
1. Improve clarity of information on what is expected from industry	18
2. Speed up the process	17
3. Emphasize economics, cost-effectiveness of regulations	14
4. Regulations are not a problem, administration is satisfactory	11
5. Improve jurisdictional overlap (state/local/federal)	9
6. Improve knowledge of industrial processes	9
7. Remove adversarial relationship between regulators and industry	8
8. Improve uniformity of enforcement	6
9. Other	8
Number of comments	66
Number of firms	49

The second most frequent response was a recommendation to "cut red tape," although specific ways of streamlining the system were infrequently mentioned. Next, a number of firms asserted that environmental controls should be implemented only insofar as the private costs incurred were outweighed by the public benefits. In general, the first 75 percent to 90 percent of a firm's pollution output can be reduced relatively inexpensively, but eliminating the remainder can be extremely costly. A related comment was that firms should be allowed greater freedom in applying technologies to meet stated performance standards rather than be required to follow a governmentally approved process.

The fourth most frequent comment, "regulations are not a problem, administration is satisfactory," stands apart from the other recommendations in that in these cases the firms took the time to state that the process had worked well for them.

Comment five dealt with the problem of jurisdictional overlap among state, federal, and local agencies which can be very confusing for some environmental programs. Recommendation eight also relates to this issue, because with the different jurisdictions enforcement may vary considerably.

Comments six and seven pertain to the staffing of regulatory agencies. Typically an environmental regulator must regulate a wide variety of industries and accordingly must be familiar with a host of industrial processes. But as technology changes, these processes also change. As a consequence, environmental rules that once may have been appropriate may become outmoded. Ideally, a regulator could acquire the specialized knowledge to keep up with industry changes and adapt environmental regulations to these processes. Practically, however, because of staffing limitations, staff turnover, changes in administration, and inflexible statutes in some areas, it is difficult for environmental management staff always to be responsive.



Other, less frequently offered comments, were generally related to the first eight listed and included the suggestion to improve the regulator's technological modeling capability, to provide more incentives, to reduce regulatory staffs, to make rules more lenient, and to have the federal government delegate greater authority to the state. One respondent, who did not participate in the survey stated, "There is nothing government can do to help us." In sum, however, the great majority of the respondents were basically satisfied with the system, perceiving environmental regulations as no more cumbersome than most other aspects of running a business.

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APPENDIX A

"Industrial Facility Location in the South Atlantic Region"  
Parts 1 and 2

Survey Questionnaires and Cover Letters





School of Business Administration  
919/962-8301

The University of North Carolina at Chapel Hill

Carroll Hall 012A  
Chapel Hill, North Carolina 27514

## INDUSTRIAL FACILITY LOCATION IN THE SOUTH ATLANTIC REGION

### Instructions:

This survey should be addressed by an executive who was involved in or familiar with recent industrial facility location decisions at your plant. The survey focuses on the relative importance of a variety of business factors and community quality of life considerations in making decisions on new plant sites or major plant expansions in the South Atlantic region. In the next two weeks a researcher will call you from the Business School at The University of North Carolina to record your responses to the questions presented below and to ask a number of additional questions on your experiences with industrial facility siting. To expedite the phone survey we would appreciate it if you would take the time to review the questionnaire and to think about the major criteria your firm used in locating this plant. To assure the confidentiality of participants, survey results will only be reported by industry groupings. Thank you for your help. We look forward to talking with you.

**Background:** *Please review for accuracy and complete remaining questions.*

1. Name of firm: \_\_\_\_\_
2. Address: \_\_\_\_\_  
\_\_\_\_\_ Zip Code \_\_\_\_\_
3. Contact: \_\_\_\_\_ Position \_\_\_\_\_
4. Telephone number: \_\_\_\_\_
5. Type of growth:  
New plant \_\_\_\_\_ Branch plant \_\_\_\_\_ Expansion of existing facility \_\_\_\_\_ Relocation \_\_\_\_\_  
(If relocation, from where? \_\_\_\_\_ )
6. Standard Industrial Classification Codes for the operations at this location (SIC #s): \_\_\_\_\_  
\_\_\_\_\_
7. Number of employees at this location: \_\_\_\_\_
8. Timing of facility operations:  
When was this facility planned? \_\_\_\_\_  
When did construction begin? \_\_\_\_\_  
When did the facility open for full operation? \_\_\_\_\_
9. Organization: Parent company \_\_\_\_\_  
Location of national headquarters \_\_\_\_\_
10. Site selection decision was made mainly by:  
Plant personnel \_\_\_\_\_ Regional headquarters \_\_\_\_\_ National headquarters \_\_\_\_\_ Other \_\_\_\_\_
11. In locating this facility did you consider alternative sites? Yes ☐ No ☐ (If no, continue to question #12)  
Where were these sites located? *List only the top five sites if more than five were considered. Note your next best site first; it is not necessary to rank other sites listed.*

Community	State
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

## Industrial Location Factors

### Business Factors

12. In considering the location of this facility, how important were the following business factors? *Please rate each of these business factors on the five-point scale presented below, based on their relative importance at the time the siting decision was made.*

*Rating scale:*

Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1	2	3	4	5

**Business Factors: Please check a box for each factor.**

	1	2	3	4	5
Labor productivity					
Skilled labor supply					
Unskilled labor supply					
Availability of technical training programs					
Wage rate					
State/local industrial climate					
Business taxation					
State financial incentives					
Water supply					
Public wastewater treatment capacity					
Solid/hazardous waste disposal facilities					
Electricity availability/cost					
Fuel availability/cost					
State/local environmental regulations and permit processing					
Transportation					
Proximity to markets					
Proximity to suppliers/services					
Land availability/room for expansion					
Cost of land and construction					
Other business factors (please list and rate)					

13. Were the business factors at the site you selected significantly different from those at your next best site? (If you considered only one site, continue to question #14.) *If your final site was better than your next best site, check the "+" box; if it was about the same as your next best site, check the "0" box; if it was worse than your next best site, check the "-" box.*

**Business factors, comparison between sites: Please check a box for each factor.**

+ 0 -

Labor productivity

Skilled labor supply

--	--	--

(Continued next page)

- Unskilled labor supply
- Availability of technical training programs
- Wage rate
- State/local industrial climate
- Business taxation
- State financial incentives
- Water supply
- Public wastewater treatment capacity
- Solid/hazardous waste disposal facilities
- Electricity availability/cost
- Fuel availability/cost
- State/local environmental regulations and permit processing
- Transportation
- Proximity to markets
- Proximity to suppliers/services
- Land availability/room for expansion
- Cost of land and construction
- Other business factors (*please list and rate*)

[illegible]


14. In considering the location of this facility, how important were the following community quality of life factors? Please rate each of the quality of life factors using the five-point scale described in question #12.

1 2 3 4 5

- Housing
- Educational system
- Recreational opportunities
- Cultural resources
- Entertainment
- Personal taxes
- Cost of living
- Physical quality of air and water resources
- Aesthetic quality of natural landscape (scenery)
- Open space
- Transportation (local traffic conditions/public transportation)
- Climate
- Other (*please list and rate*)

[illegible]



15. Were the community quality of life factors at the site you selected significantly different from those at your next best site? (If you considered only one site, continue to question #16.) *If your final site was better than your next best site, check the "+" box; if it was about the same as your next best site, check the "0" box; if it was worse than your next best site, check the "-" box.*

**Community quality of life factors, comparison between sites: Please check a box for each factor.**

	+	0	-
Housing			
Educational system			
Recreational opportunities			
Cultural resources			
Entertainment			
Personal taxes			
Cost of living			
Physical quality of air and water resources			
Aesthetic quality of natural landscape (scenery)			
Open space			
Transportation (local traffic conditions/public transportation)			
Climate			
Other (please list and rate)			

### Assessment of Location Factors:

16. Taken as a group, how important were the business factors listed in question #12 in determining your final site selection? *Use the 1 to 5 scale described in question #12.*

1 2 3 4 5

--	--	--	--	--

17. Taken as a group, how important were the community quality of life factors listed in question #14 in determining your final site selection? *Use the 1 to 5 scale described in question #12.*

1 2 3 4 5

--	--	--	--	--

18. Rank the top three states in the nation you would consider if you were to locate a new plant in the next year.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

19. What business and community quality of life factors determined your first choice in question #18? *Please rank your top five factors, selecting your choices from the lists presented in questions #12 and #14.*

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

Firm Code # \_\_\_\_\_

### Environmental Management Issues

(Now that we have completed the first part of the survey on the major factors in industrial facility siting, we would like to continue with a series of questions on your experiences with environmental management issues.)

20. What specific environmental permits did you have to secure to construct and operate this facility? Yes 1 No 0 Not Sure 2

(1) Air quality permit.....	<u>69</u>
(2) PSD (Prevention of significant deterioration).....	<u>70</u>
(3) Water quality permit.....	<u>71</u>
(4) NPDES (National Pollution Discharge Elimination System).....	<u>72</u>
(5) Hazardous waste permit.....	<u>73</u>
(6) Solid waste permit.....	<u>74</u>
(7) Dredge and fill.....	<u>75</u>
(8) Other _____	<u>76</u>
(9) Other _____	<u>77</u>

21. How did you perform the environmental analysis necessary to file environmental permit applications? Yes 1 No 0 Not Sure 2

(1) In-house staff.....	<u>78</u>
(2) Environmental consultant.....	<u>79</u>
(3) Industrial siting consultant.....	<u>80</u>
Firm code.....	<u>1</u> _____ <u>4</u>
Card #.....	<u>5</u>
(4) Process design consultant.....	<u>6</u>
(5) State industrial development staff.....	<u>7</u>
(6) State environmental management staff.....	<u>8</u>
(7) Other _____	<u>9</u>

22. When do you begin the consideration of environmental requirements?

10

Code

- (1) From the time the planning process starts
- (2) During site selection
- (3) During process design but after site selection
- (4) Just prior to construction
- (5) Other \_\_\_\_\_

23. Have you had previous experience with the environmental permitting process? Yes 1 No 0

11

24. In terms of the following factors, how does the environmental program of the state you located in compare to those of other states you are familiar with? (I'm going to mention a number of factors, after each factor please tell me if \_\_\_\_\_ (the state this facility is located in) is better than, worse than, or about the same as other states you have dealt with.) (+)1 (0)2 (-)3

(1) Time required to review and issue a permit.....

12

(2) Ease of analysis required.....

13

(3) Availability of data.....

14

(4) Reasonableness of enforcement policy.....

15

(5) Special state requirements (list).....

16

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

25. Were any of the factors mentioned in the previous question important to the final site selection? Yes 1 No 0

17

If yes, which ones? \_\_\_\_\_

18

\_\_\_\_\_

19

\_\_\_\_\_

20

\_\_\_\_\_

21

26. Was the cost of complying with an environmental regulation a consideration in making the final site selection?

Yes 1 No 0

23

If yes, which regulations were involved?

24

25

26

27. Consider the following statement and tell me if any of the possibilities happened to you.

In siting this facility, did an environmental regulation or regulatory process cause you to:

- (1) Change your facility design? Yes 1 No 0

27

If yes, which permits were involved? \_\_\_\_\_

28

29

30

- (2) Delay your construction schedule? Yes 1 No 0

31

If yes, which permits were involved? \_\_\_\_\_

32

33

34

How long was the delay (in code months)

0 -less than month

36

- (3) Avoid a site because the assimilative capacity of the stream or river was too low to accept discharge of wastewater? Yes 1 No 0

37

If yes, where was this site located? \_\_\_\_\_

39

- (4) Avoid a site because the existing air pollution level would require you to install extra controls?

Yes 1 No 0

40

If yes, where was the other site located?

42



28. Did you locate at this site because a permit was denied at another site or because it would have taken too long to obtain a permit at another site? Yes 1 No 0

43

If yes, where was the other site located? \_\_\_\_\_

45

If yes, which permits were involved? \_\_\_\_\_

46

47

48

29. Do you use a public wastewater treatment facility?  
Yes 1 No 0

49

Do you have your own waste treatment plant?

Yes 1 No 0

50

30. What fuel(s) do you use for process or space heating? (If more than one, give two main fuels.) \_\_\_\_\_

51

Code

52

### (1) Electricity

(2) Gas (natural or LP)

(3) Residual oil (#5 or #6)

(4) Distillate oil (#1 or #2)

(5) Coal

(6) Wood

(7) Other \_\_\_\_\_

31. If you had to do it over again what would you do differently?

53

54

55

56

57

32. Do you have any recommendations for improving the environmental regulatory process? (Such as changes in regulations or addition of incentives)

_____	58
_____	59
_____	60
_____	61
_____	62



THE UNIVERSITY OF NORTH CAROLINA  
AT  
CHAPEL HILL

School of Business Administration

August XX, 1981

The University of North Carolina at Chapel Hill  
Carroll Hall 012 A  
Chapel Hill, N.C. 27514

Mr. Howard Manager  
ABC Company  
999 Elm Street  
Anytown SC 22222

Dear Mr. Manager:

The Business School of the University of North Carolina at Chapel Hill is conducting a survey of firms that have located or made major expansions in North Carolina, South Carolina, and Virginia during the last four years. The executive involved in the development of a new or expanding industrial facility must consider a number of business factors, such as labor and transportation, prior to locating an industrial facility. Recently, governments at all levels have also attempted to influence industrial location through industrial recruitment programs, financial incentives, and regulatory programs. It is our expectation, with your assistance, that this study will assess the major criteria for site selection in the South Atlantic region as well as point to improvements in existing government programs.

Through a random sampling procedure, your firm has been selected to participate in the survey. Enclosed is a questionnaire on a number of site selection considerations. Within the next two weeks, one of us will call you to record your company's responses to these questions and to ask a number of additional questions on your experiences with industrial facility siting. To assure the confidentiality of participating firms, survey results will only be reported by industry groups. If after reviewing the enclosed material you determine that other individuals in your firm have been more closely involved with facility siting issues, please share the enclosed questionnaire with them.

Thank you for contributing your time and experience to this project. We look forward to talking with you.

Sincerely yours,

Roger Pratt  
Research Associate

Tony Marimpietri  
Research Associate

TM:pa

Enclosures: (1)



THE UNIVERSITY OF NORTH CAROLINA  
AT  
CHAPEL HILL

School of Business Administration

August XX, 1981

The University of North Carolina at Chapel Hill  
Carroll Hall 012 A  
Chapel Hill, N.C. 27514

Mr. James Executive  
XYZ Company  
1200 Main Street  
Anytown, NC 27777

Dear Mr. Executive:

A few weeks ago I sent you a copy of the survey on Industrial Facility Location and expansion in the South Atlantic. When I spoke with you or one of your associates on the phone, you indicated that you would be willing to fill this out and return it to us. We are trying to bring the survey to a close, and we would appreciate receiving your response. I am enclosing another copy of the form.

I want to urge you to participate in this survey. Our success in this project concerning the experiences of firms such as yours depends on a high response rate.

Thank you very much.

Sincerely,

John Researcher

Enclosures: (1)





THE UNIVERSITY OF NORTH CAROLINA  
AT  
CHAPEL HILL

School of Business Administration

August XX, 1981

The University of North Carolina at Chapel Hill  
Carroll Hall 012 A  
Chapel Hill, N.C. 27514

Mr. Robert Officer  
Widget Company  
1212 Oak Drive  
Anytown, VA 22222

Dear Mr. Officer:

A few weeks ago I sent you a copy of the survey on industrial facility location and expansion in the South Atlantic. I have been unable to reach you on the phone to complete the survey, and so I would like to request that you fill it out and mail it back if possible. I am enclosing another copy as well as the second part of the survey, concerning environmental permits and the problems associated with them. This was originally designed to be done over the phone, but we would appreciate it if you could make it out and send it to us.

I want to urge you to participate in this study. Our success in this project concerning the experiences of firms such as yours depends on a high response rate.

Thank you very much.

Sincerely,

John Researcher

Enclosures: (1)

APPENDIX B

ENVIRONMENTAL REGULATIONS IN NORTH CAROLINA,  
SOUTH CAROLINA, AND VIRGINIA



## APPENDIX B

### ENVIRONMENTAL REGULATIONS IN NORTH CAROLINA, SOUTH CAROLINA, AND VIRGINIA

Environmental regulatory programs in North Carolina, South Carolina, and Virginia were reviewed in order to isolate program characteristics which might influence industrial location decisions. Information on state environmental programs was obtained from published state and federal statutes, laws, and regulations and from personal interviews with over 30 state industrial development and environmental management personnel in the three states.

Major differences among the environmental programs in North Carolina, South Carolina, and Virginia are highlighted in this section, as well as similarities which occur because of federal law or state preference. The key characteristics of environmental regulations identified here were included in the survey of industrial location decisions, reported below, to determine whether they actually have had an effect on the sites selected by firms locating in the South Atlantic region.

Three aspects of state regulatory programs may influence industrial location: administrative practices, cost impacts, and technological barriers. Administrative influences result from the ways in which state environmental standards are implemented. Cost impacts occur because of the stringency of the standards themselves. Technological barriers are those resulting from the physical limitations of the environment and an inability to control pollutants sufficiently to meet environmental quality standards. Of course, these categories overlap to some degree, but they form a basis for analyzing differences in regulatory programs and examining program impacts on industrial location.



The scope of this review is limited to air quality, water quality, solid waste and hazardous waste management programs. Other programs often included under the rubric of environmental regulation are not included. The coastal area management program is not examined because it is limited to a specific geographical region and involves issues that are unique to that region. Occupational safety laws are not included because they deal with the indoor environment and are essentially different from environmental quality programs. Geophysical programs having to do with mining, drilling, and dam safety are not included, since the number of industries they might affect is limited. Finally, nonpoint water pollution control and sedimentation control are also not included as they do not directly impact industrial operations. Thus, the focus is on those national air, water, and hazardous waste programs which emerged from Congress during the 1970s and which the states have considerable responsibility for implementing.

### Air Quality

All state air quality programs operate under the framework of the federal Clean Air Act as amended in 1977. The Clean Air Act establishes a regulatory program for achieving national ambient air quality standards. Currently six pollutants are so regulated: total suspended particulates, sulfur dioxide, nitrogen oxides, carbon monoxide, oxidants, and lead. The most recent addition was a lead standard which was promulgated in October, 1978. In areas where air quality is significantly better than the ambient air quality standards, a policy of prevention of significant deterioration governs. This program requires all large sources of air pollutants to install highly efficient pollution control systems and to assure, on a case by case basis, that the prescribed air quality limits are not violated. These limits, or increments, are specified as Class I, II, or III by the Clean Air Act.

Class I is the most stringent, allowing the least amount of deterioration. Congress specified a number of areas as Class I in the Clean Air Act. All other areas are Class II but may be modified by a state with approval of the federal Environmental Protection Agency (EPA).

In those areas where the national ambient air quality standards are violated, a non-attainment planning program was prescribed in the act. In these highly polluted areas no new air pollution source may be established unless stringent pollution control equipment is installed and the fact that the air quality will not be further deteriorated is demonstrated. The demonstration of no further deterioration can be accomplished by acquiring allowed emissions from existing air polluters or through an overall reduction in pollution levels through state and local pollution control programs.

The states are responsible for administering the air quality control program and for establishing state implementation plans which set for the regulations which will be enforced. The implementation plan contains the state regulations for industrial sources (both new and existing). The states follow EPA guidelines but have considerable discretion in setting emission standards, so long as it can be demonstrated that they are sufficient for achieving national ambient air quality standards. In addition to these state standards, the states may be delegated the responsibility for enforcing federally promulgated New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP). These standards apply to all new, large air pollution sources and, by design, are uniform throughout the nation.

North Carolina, South Carolina, and Virginia have been delegated all responsibilities for implementing the air quality control program. Thus the national ambient air quality standards, New Source Performance Standards, and

National Emission Standards for Hazardous Air Pollutants are enforced by these states. An implementation plan in each state sets forth standards that regulate sources not covered under federal regulations but which must be controlled in order to maintain the national ambient air quality standards.

There are few nonattainment areas in the three states. These are listed in Table II-1 along with the pollutant(s) for which they have been so designated. In these areas the states must require more stringent control of each source of the pollutant which is above the ambient standard and must assure that no new source is constructed which will result in a deterioration of air quality.

Most areas in these states have been classified as Class II under the Prevention of Significant Deterioration (PSD) Program. The few Class I areas are listed in Table B-2. Under the PSD program the states must assure that stringent pollution control measures, referred to as Best Available Control Technology (BACT), are installed and that no PSD increment is violated. The most severe restriction of emissions usually results when a Class I area is impacted.

Because most states follow the federal lead, many standards are the same from state to state. In North Carolina, by general statute, no standard may be more stringent than a federal standard if a federal standard exists. Thus federal standards and many of the state-originated standards are the same in the three states.

A few of the differences that exist are summarized below. North Carolina has separate standards for wood burning and mica processing which allow slightly more particulate emission per unit processed than do South Carolina or Virginia. North Carolina has a more stringent particulate standard for

TABLE B-1  
NONATTAINMENT AREAS IN VIRGINIA, NORTH CAROLINA,  
AND SOUTH CAROLINA

Designated Area	Pollutant(s)
<u>Virginia</u>	
1. Roanoke County, Roanoke City, and Salem County	Oxidants
2. Stafford County	Oxidants
3. Richmond City, Henrico County, Chesterfield County	Oxidants
4. Cities of Chesapeake, Norfolk, Portsmouth, Suffolk, Virginia Beach, Newport News, and Hampton	Oxidants
5. Alexandria, Arlington County, and High Traffic Density Areas of Fairfax County	Oxidants Carbon Monoxide
6. National Capital Interstate Air Quality Control Region Other Than Listed Above	Oxidants
<u>North Carolina</u>	
1. Mecklenburg County	Oxidants Carbon Monoxide
<u>South Carolina</u>	
1. Charleston (City)	Total Suspended Particulates Oxidants
2. Charleston and Berkeley Counties	Oxidants
3. Columbia (City)	Carbon Monoxide
4. Richland and Lexington Counties	Oxidants Carbon Monoxide
5. York County	Oxidants
6. Georgetown	Total Suspended Particulates



TABLE B-2

CLASS I PREVENTION OF SIGNIFICANT DETERIORATION AREAS IN  
VIRGINIA, NORTH CAROLINA, AND SOUTH CAROLINA

Virginia

1. Shenandoah National Park
2. James River Face (a small park)

North Carolina

1. Smokey Mountains National Park
2. Joyce Kilmer Slick Rock National Wilderness Area
3. Linville Gorge National Wilderness Area
4. Shining Rock National Wilderness Area
5. Swan Quarter National Wilderness Area

South Carolina

1. Cape Romaine Wilderness Area

pulp and paper mill operations. Both South Carolina and Virginia have a fugitive dust regulation. North Carolina does not. The South Carolina fugitive dust standard applies only in areas that are nonattainment for particulates.

Sulfur dioxide regulation for small boilers is more stringent in North Carolina and for larger boilers is more stringent in Virginia. Finally, Virginia has a series of regulations pertaining to petroleum refining that do not exist in North Carolina and South Carolina. No systematic differences occur and the pattern of difference most likely reflects the needs of the states to control sources unique to their jurisdictions. It is the purpose of the State Implementation Planning Process to allow states to tailor regulation in this manner.

One major difference exists in the control of Volatile Organic Compounds (VOC). For areas that are nonattainment for oxidants, volatile organic compounds must be stringently controlled because they are a precursor to oxidant formation. EPA has promulgated guidelines for controlling volatile organic

compounds. North Carolina and Virginia apply these more stringent standards to only the nonattainment areas where they are required. South Carolina applies them statewide.

Another difference which existed during the study period (1977-1981) was the degree of delegation of the PSD program. Prevention of Significant Deterioration was formally incorporated into the Clean Air Act in 1977. Subsequently EPA promulgated a set of regulations for implementing the program. These regulations were tied up in a series of court challenges which delayed the program and caused a series of regulatory changes. These regulations, however confusing they may have been, were the same in all states. The PSD program requires BACT controls to be installed. BACT is evaluated on a case by case basis. All three states claim to use the federal New Source Performance Standards as a guide. Therefore, for the most part the interpretation of BACT is very similar in the three states.

The South Carolina program was delegated PSD authority in October, 1976, under regulations which existed prior to the 1977 amendments. Virginia was delegated authority in June, 1981, and North Carolina has not yet been delegated the authority, but delegation is expected early in 1982. Not having delegated authority means that a state may be involved in the review, but EPA must issue the permit. Such a two-level review could result in additional delays in processing permit applications.

In summary, the majority of the air quality control program is very similar among these three states. Administrative differences could result from the time required for permit application review. The PSD program is the most likely area where this might occur. Cost impacts could occur, especially with respect to volatile organic compound regulations. Minor cost impacts might also result from some of other small differences in state

emission control standards. Finally, technological barriers could result if a source attempts to locate in or near a nonattainment or PSD Class I area. Each of these potential influences on industrial location was examined in the survey of firms.

### Water Quality

The state programs to control water quality fall under the framework of the Clean Water Act (P.L. 92-500 as amended in 1977). This act sets forth the operational goal of attaining swimable and fishable waters by 1983. The Act also requires the U.S. Environmental Protection Agency (EPA) to promulgate effluent or so called "end-of-pipe" standards for major industrial sources of water pollution. These programs are to be administered by the states with support and oversight by EPA.

State programs are required to establish stream water quality classifications and to designate every stream segment in a state's jurisdiction accordingly. These stream water quality classifications set forth the in-stream standards which are to be achieved in an effort to meet the objectives of the act. The EPA has published criteria to guide the states in setting standards and all state stream classifications must be approved by EPA.

The effluent standards are enforced through administration of the National Pollution Discharge Elimination System (NPDES). The states are encouraged to accept delegation of this program and to administer it within their jurisdictions. In addition to administering the NPDES, states may also adopt standards which regulate non-surface water discharges and ground water quality.

The effluent standard and stream classifications are related to each other through the regulatory process of the NPDES. All water pollution

sources must meet the effluent standard regardless of the quality of the water in the stream segment upon which they locate. If this prescribed degree of control is sufficient to protect in-stream quality, then the effluent standard governs. If, however, analysis shows that the effluent standard will not satisfy the in-stream water quality standards, then additional control must be utilized. Such discharges are known as water quality limited because the stream water quality standards limit the amount discharged, not the effluent standards.

In addition to regulation of industrial sources of water pollution as described above, the Clean Water Act also regulates municipal wastewater treatment plants by requiring primary and secondary treatment and additional treatment when required by the in-stream water quality standards. To assure that the treatment plants function properly and meet the water quality standards, local jurisdictions operating such plants may not accept any waste they cannot treat. In addition, EPA is promulgating a series of pretreatment standards designed to protect the operation of treatment plants and to control for pollutants which are not adequately treated by the central waste treatment plant. These regulations may affect industries desiring to utilize a local waste treatment plant.

North Carolina has adopted a four-category stream classification system with special subgroups for trout, swamp, and tidal waters. The main classifications are summarized in Table B-3. The state's waters are classified by stream segment. Approximately 60 percent of the segments in the state are classified as C; 2.5 percent are classed as B and approximately 13 percent are classed as either A-I or A-II. The remaining percentages are covered under special salt water categories. It is not possible to examine this breakdown to determine the degree of stringency of the state's program.



TABLE B-3

NORTH CAROLINA STREAM WATER CLASSIFICATIONS

Class	Best Use	Quality Conditions
A-I	Water supply	Waters having watersheds which are uninhabitated or otherwise protected by the Department of Human Resources and requiring minimal treatment to meet national drinking water standards.
A-II	Water supply	Water which, if subject to approved normal treatment, will meet national drinking water standards
B	Primary Recreation	Waters will meet accepted standards of water quality for outdoor bathing and are of sufficient size and depth for primary recreation purposes
C	Fishing, secondary recreation, and agriculture	Waters will be suitable for fishing, fish and wildlife propagation
SA <sup>*</sup>	Shellfishing for market purposes	Water must meet the 1965 sanitary and bacteriological standards recommended by the Public Health Service
SB	Primary recreation	Water will meet accepted standards of water quality for outdoor bathing and are of sufficient size and depth for primary recreation purposes
SC	Fishing and secondary recreation	Water will be suitable for fishing, fish and wildlife propagation

\* All "S" classes are for tidal salt water areas.

For one, the segments vary in length and so the miles of stream classified a certain way cannot be easily determined. In addition, segments vary in the degree of industrial user interest depending on location and proximity to other factors of production. Finally, the water quality in most segments is better than the classification allows and if the effluent standards are adequate, the stream water quality classification is not the determining factor for the degree of control required of the industry.

Virginia has adopted an entirely different classification system and direct comparisons with North Carolina are not particularly meaningful. South Carolina has a classification system very similar to North Carolina. South Carolina does not have a Class C category.

South Carolina classifies approximately 60 percent of its stream segments as B. The South Carolina B and North Carolina C classes are virtually identical in main pollutant categories. The North Carolina B is the same as the state's C category except that B provides for less coliform contamination in warm months to protect waters for intensive swimming use. Thus, the majority of the fresh water in North Carolina and South Carolina is classified according to very similar standards.

The A category is designed to protect water supplies in the state and is thus influenced by the number and location of municipal and private water supplies. North Carolina has fewer stream segments so classified than does South Carolina, but some of North Carolina's A-II segments extend as far as twenty miles upstream from a water supply intake.

Recall that these stream water quality standards are not translated directly into a degree of control for industry. Only about 50 percent of the NPDES permits issued for industrial process discharges are affected by the stream standard. The rest are regulated by federally promulgated effluent standards.

The major effect on industry is the direct regulation of discharges through enforcement of effluent standards via the NPDES permit system. Any industry seeking to discharge pollutants into surface waters must comply with applicable effluent standards. These standards are promulgated by EPA for specified industrial processes. North Carolina, South Carolina, and Virginia have had authority to administer the NPDES system since 1975. Thus in each of these states, for many industrial categories, there is a uniform system of standards and similar permit processes.

In each of the three states local governments are responsible for operating wastewater treatment plants. Industrial connections to these facilities are regulated by municipal sewer use ordinances. Waste can be accepted when the treatment plant has the capacity to handle it, but only if the waste is compatible with the waste treatment processes. States oversee local jurisdictions to assure that the stream water quality standards are not jeopardized by waste treatment plant operations.

A federal pretreatment program is being implemented but as of 1981 has not progressed to a level which would affect industrial location. The first promulgated pretreatment standard applies to electroplating operations and has a compliance date of December, 1982, at the earliest. Once the program is completely implemented, the pretreatment standards will be enforced as part of the local sewer use ordinances.

The Water Quality Control programs in each each state have many similarities. Although the number of miles classified a particular way is difficult to determine, it is reasonable to conclude that the majority of the stream segments share very similar standards. Recall that the presence of federal criteria and oversight is a factor in determining how streams are classified.

The states manage toxic wastes differently, but the goals and degree of enforcement resulting from their policies are similar. North Carolina has a set of specific numerical standards that apply to all stream segments. An additional set of standards applies to waters used as drinking water supplies and uses a general "Harmful to Public Health and Aquatic Life" clause for other stream segments. South Carolina has no numerical standards but reviews each application to assure protection of human health and aquatic life. The existence of standards does not imply greater stringency in the program. The choice of standards or case-by-case review, rather, reflects a preference in regulatory approach. The policies of the three states are similar.

The federal program under the Clean Water Act is designed to protect surface waters. Thus only discharges into surface water are directly regulated. All three states have programs to protect ground water, although these programs are less structured than the one described above. North Carolina controls all waste discharges including septic tank and land applications. Permits are issued only after a review of the disposal technique confirms that ground water quality will not be impaired. South Carolina has a similar approach and has adopted a policy of at least protecting ground water quality for drinking water supply uses. Both states prohibit deep well injection. Virginia has adopted a set of numerical standards and uses these standards to guide the issuance of certificates of approval which are required of all land application techniques. Virginia does not outright prohibit deep well injection but has a policy discouraging its use. No deep well injection permits have been issued.

Of these differences only a few are likely to have a locational impact. Differences in stream classification must first be translated into specific



effluent standards through the NPDES process to have an impact. Such impacts may result in cost differences between sites. The same is true for ground water regulations.

It is possible, however, that some stream segments are overloaded and these cannot assimilate any more industrial waste. In such a case the industry would be forced to either avoid the site due to technological considerations or to install more expensive controls.

Any industry desiring to hook up to a local wastewater treatment facility may also face capacity limitations. The industry then must decide to construct its own waste treatment plant or seek out a municipality with sufficient capacity to accept its wastewater.

Finally an application for a permit can be a complex task. Data must be available on stream characteristics as well as water quality. A similar requirement also exists in air quality permitting. States vary with regard to the data available for conducting the type of analysis required to file a permit application.

Each of the above potential influences on industrial location have been examined in the survey of firms. Again the cost impact stands in for the impact of different numerical standards. As in the air program, there are few differences among the states that would suggest a major influence on industrial location behavior.

#### Solid and Hazardous Waste Disposal

Congress enacted the Resource Conservation and Recovery Act in 1976. The act provides for the establishment of guidelines for the disposal of non-hazardous waste and direct regulation of hazardous wastes. Federal regulations were delayed and subject to a number of court actions. As of November, 1980 all new facilities generating, storing, transporting, treating, or

disposing of hazardous waste have been required to obtain permits and comply with standards of performance. Permits, however, could not be issued until the standards were promulgated. New generators and transporters of hazardous waste could obtain approvals as of November 1980. These facilities must comply with labeling, disclosure, and manifest system requirements ("cradle-to-grave" tracking of waste).

Federal standards for storage and treatment of hazardous waste (with the exception of thermal treatment) have been in effect since July, 1981. Interim standards for land disposal have been in effect since August, 1981. The interim standards are expected to be replaced by final standards in early 1982. Thus permits have been issued by EPA for the new facilities described above since the effective date of the respective performance standards. Facilities existing prior to November, 1980 were approved by the respective state programs.

Virginia, North Carolina, and South Carolina prior to November 1980 each had some state authority to issue permits or grant approval for operation of hazardous waste disposal facilities. Few central, commercial disposal operations were authorized. Industrial incineration, on-site disposal, and lagoons or storage ponds were approved. The latter were approved under authority of the water quality programs. No complex systems of standards existed but a review of the proposed operations and reasonable attention to public health and safety requirements were the guiding criteria. Existing facilities have been granted interim operating status and will be subject to the provisions of RCRA, though the specific standards that will be applied are not yet final for all categories.

The states have been granted authority to monitor hazardous waste facilities and to administer the federal manifest system in their respective

jurisdictions. None of the three states has yet received authority to issue hazardous waste permits under RCRA. Each state is actively seeking such delegation.

The disposal of hazardous waste is a complex task and can be capital intensive. Therefore, large scale central facilities are encouraged for disposal of industrial wastes. These facilities may be public or private or some kind of joint venture. In either case the existence of these facilities is a service to industry. A list of sites in North Carolina, South Carolina, and Virginia is provided in Table B-4. For solid waste local governments provide facilities and can accept industrial waste as long as sufficient capacity exists. In some cases industries are encouraged to develop their own landfills so as to preserve space in the public landfill.

The regulation of hazardous waste is directed by federal standards. Therefore, the same standards apply. The major difference exists in the number of commercial disposal facilities available to serve industry. South Carolina has the largest number of facilities, most of which operate as regional facilities. All three states are devoting efforts to assure that there is an adequate capacity for hazardous waste disposal.

The availability of hazardous and to a lesser extent nonhazardous disposal facilities may have an impact on industrial location especially for those industries which generate a large volume of hazardous waste and do not want to incur large transportation costs. The importance of such facilities was examined directly in the survey of firms.

#### Consolidation and Coordination

For the past several years there has been much discussion of the advantages of consolidating environmental regulation. Such attempts address the need to streamline and simplify the regulatory process for industry. There

TABLE B-4

COMMERCIAL HAZARDOUS WASTE TREATMENT AND DISPOSAL FACILITIES  
IN VIRGINIA, NORTH CAROLINA AND SOUTH CAROLINA

Location	Type	Wastes Accepted
<u>Virginia</u>		
Marksville	Solvent recover	Low boiling point solvents
Richmond	Incinerator	Solvents
Buckingham	Landfill (not operational)	Case by case review
<u>North Carolina</u>		
Lenoir	Incinerator	Non-halogenated solvents and flammable liquids
Raleigh	Waste oil recovery	Bulk load waste oil
Charlotte	--	Solvents
Charlotte	--	Waste oil
<u>South Carolina</u>		
Pinewood	Landfill	Case by case review
Roebuck	Incinerator	Can handle most hazardous wastes
Barnwell	Landfill	Low level radioactive wastes
Rock Hill (in-state firms only)	Incinerator	Solvents and flammable waste
Greer	--	Solvents
Greer	--	Waste oil
Lyman	--	Waste oil
Spartanburg	--	Waste oil
Charleston	--	Waste oil

Note: The only landfill facilities are those listed as such above.



are a number of environmental permits which must be obtained and consolidating them into one review process has been the goal of the various consolidation efforts at both the federal and state levels.

The federal regulatory programs are organized according to the various federal laws which provide the authority and funds for such programs. This has resulted in separate standards, permits and review requirements and separate federal grants-in-aid programs. The separate federal laws and grants, in turn, encourage the states to establish separate programs with a decentralized permitting process.

The nature of the institutional arrangements in the three states is different. South Carolina has organized all of the programs covered in this study under the Department of Health and Environmental Control. North Carolina has placed the air and water programs under the Department of Natural Resources and Community Development. Solid and Hazardous Waste and Septic Tank Regulations are under the Department of Human Resources. Virginia has three separate organizations: the State Air Pollution Control Board, State Water Control Board, and the Department of Health. The Department of Health is responsible for the solid and hazardous waste programs.

Within these organizational arrangements the three states conduct basically separate air, water, and solid/hazardous waste management programs. Various attempts to consolidate these separate procedures are in place.

Virginia has the most formal consolidation program. It is a specialized procedure and any industry wishing to use the consolidated approach may request to have its permits processed through the consolidated mechanism. The state Council on the Environment, composed of the heads of the various state agencies, two gubernatorial appointees, a chairman and administrator, coordinates the various state permitting processes. The council operates on an

informal basis and has no administrative authority over other agencies. The process is tailored to aid large, complex industrial projects, but it has not been used very frequently.

North Carolina has adopted a more informal approach. For large complex projects the Office of Regulatory Relations of the Department of Natural Resources and Community Development serves a lead role by coordinating a committee comprised of representatives of the various permit issuing agencies. South Carolina has no similar mechanism.

These various attempts all have as goals a reduction in review time, simplification of the technical analysis and provision of data to the applicants in a timely manner. Thus the benefits of the consolidation efforts will be revealed by the difference in the way the permitting process is evaluated. The relative quality of each state's administration of the permit process was directly measured in the survey of firms. It should be noted, however, that none of these states developed a review process that is essentially different from the others for the typical industrial facility. All three states utilize a relatively decentralized process and so little difference among states is to be expected.

Enforcement policy can be measured by its degree of fairness and evenhandedness. Accordingly, consistency among programs is also important. That is, firms do not want to have to meet a standard in one program that causes difficulty in meeting an environmental standard of another program. The survey of firms also addressed the relative quality of the states' enforcement policy.

Coordination among various state programs is also important. In this study the degree of coordination between environmental management programs and industrial development programs was examined.

The South Carolina approach appears to be the most formal, although all three states have some form of coordination. In South Carolina, a firm contacting the state development board (many firms do not contact the development board but go directly to the Department of Health and Environmental Control) will be introduced to the environmental regulatory requirements through a coordinating meeting involving the firm and representatives of the different areas (air, water, etc.). A state development board representative may or may not be present, because its function is only to assure that the firm knows of the regulatory requirements and makes contact with the right people. The roles of the different actors are clear. The industry is fully responsible for conducting whatever analysis is required and filing the permit application. The Department of Health and Environmental Control has complete responsibility for reviewing the permit application and denying or issuing a permit subject to normal appeal channels.

In North Carolina the industrial development agency offers assistance to firms in filing the permit application and conducting the analysis. The industry may receive information about the regulatory requirements and data necessary to conduct the analysis. The regulatory review is conducted by the Division of Environmental Management and the North Carolina Department of Human Resources. Industrial development may follow up on the more complex applications and coordinate with the environmental review agencies to assure that the application is complete and satisfies all informational requirements. The Virginia process is more similar to the North Carolina approach than to South Carolina's.

Any major differences in the coordination efforts of the three states would surface as a difference in the review process. Thus problems in this area are captured by the review of administrative influences in the survey of firms.



### Summary

The survey of firms examined the differences discussed here to determine if, in fact, any of them has an important effect on industrial location decisions. It should be noted that there are more similarities among the three states than there are differences. This is in part due to the dominant influence of the federal regulatory framework. It is also the result of the states' desire not to be too different from their neighbors with whom they are frequently compared.

The regulatory factors that are addressed in the survey of firms can be broken into four classes: services available; administrative difficulties; costs resulting from compliance with environmental standards; and technological or physical limitations.

The services that are examined through the survey include wastewater treatment facilities, solid waste, and hazardous waste disposal facilities.

Administrative factors that may influence location include the time required to review a permit application, ease of analysis, data availability, and enforcement policy.

The cost of compliance is directly dependent on the degree of stringency of the numerical discharge limitations imposed on firms. The major differences that surfaced were in the volatile organic compound regulations in the air pollution control programs of each state. Cost impacts many also result from some of the relatively minor and industry-specific differences mentioned above.

Technical or physical limits may occur whenever an industrial source is confronted with a possible violation of an environmental quality standard. In the air program this may occur in nonattainment areas of Class I areas and occasionally in Class II areas. In water it may occur because the assimilative capacity of a stream or other water body is too low. Both possibilities are directly examined in the survey of firms.



